

MARCH/APRIL 1997

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Photo: Steve Delaney



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MARCH/APRIL 1997

Arizona Dreaming

62

After two decades of putting off their remodeling dreams, a Tucson architectural designer and his wife jump at the chance to offer their 1932 Pueblo Revival home as the spring TV project. By Jack McClellan

Adobe, for the Future

70

A swirl of facts and statistics fails to fanny in a Hollywood art compound with a 16-inch thick slab of solid adobe. But the age-old formula of mud, straw and water doesn't sweeten well. Achieving a half-century constant facts that and others an Arizona couple to build a house that may last until the next millennium. By Bert Lesley

Our Father's House

76

Whether building his country into the make of a war or fighting for the war Constitution, George Washington never forgot who he really was—an obsessed homemaker. The first of a new series on America's greatest houses. By Stephen Herrigan

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Water is the Enemy

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Microscopic Menace

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Can moldhappens also—case of dozens of molds that hide out in most homes—kill children? Learn why mold and moisture must be controlled and why newer homes are more dangerous than older ones. By Susan Benson

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Shaped strips of wood are crop grape vines that hang, chains, desks and used to work the space. Tap on this month's poster to find a floor-to-ceiling guide to the classic profiles of baseboard, chair rail, casing, crown and other moldings. By John Kelsey

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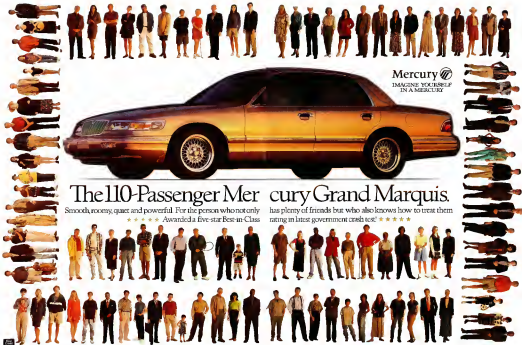


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up front

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Clarity glass, p. 44

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Read This Old House on the World Wide Web to read about our project for weeks, view archival photos and get up-to-the-minute neighborhood schedules for the show. www.thisoldhouse.com/TOH/

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A COLLECTION SO STYLISH IT STIRS THOUGHTS OF PARIS, MILAN AND THE NEW YORK STRIP.

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LOOKS AT THE
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"If music is the universal language, few people are more eloquent than Marvin Hanlisch. His award-winning melodies and musical scores include "The Way We Were," and "A Christmas Carol." Yet few things in life give him more pleasure than a



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contributors

MARCH/APRIL

As *This Old House's* editorial correspondent,

BRENEN MAGNATH researches and responds to all readers' questions and requests. The number one query: "Will you restore my house?" The exact response: Do we have plans for a cookie, and does Steve have a *This Old House* tattoo? (We don't, and he doesn't.) **MICHAEL GLENBLYTH** (photographer,



"Resting Ancestress") has shot covers for *Time*, *Time Digital* and *U.S. News and World Report*, and his photo illustrations have appeared in more than 20 magazines. Recently married and living in Los Angeles, he will soon head for Pakistan to photograph whale fossils. German-born



photographer **MICHAEL ORRIN** ("Snad Gums") has been based in New York for 10 years. He has



recently completed assignments in Florence, along the west coast of Italy and in the town of



Gammarus in northern Portugal. **SUSAN DEMESEU** (author, "The Measure of Mold and Mildew") was for eight years a reporter for *The Miami Herald*. She recently cofounded a book and museum in English and American poets for the New York Public Library. (212) 645-7140/1214@compuserve.com

Next Issue

- Secrets of a roofing gals' job
- Beautiful, no-maintenance concrete floors
- Kitchen cabinets made of tough materials
- Lightning bolts to save your house
- Push research that makes this cut

PLUS: Mail pullers, other news, calling fans, water filters, satellite dishes and more

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making walls—or maybe it was her waste canister—I learned that he is the type to fudge plans like algebra. He whole kitchen seemed to be missing, thanks to the was potting thing over so slightly to the right. Why had I never noticed this before?

Because people aren't supposed to notice such things. Because wallpaper is supposed to be background. But it no longer was to me. The background of my life had become the foreground. And vice versa.

It could happen to anyone. When you take on a home remodeling project, your whole world is suddenly seen through this prism. The phenomenon goes well beyond a matter of observing about something—as, say, you do when you're hungry and all you can think of is sliding your teeth into a burger. It's more of an ongoing thing, a total brain shift. Your head is not quite the head it once was.

I'll give you an example, roofing. When I was putting a new roof on my house, it got so I could look at my house in the neighborhood and accurately gauge the weight of the asphalt shingles (Well, I imagined I was accurate, I never knocked on the door to ask.) But when a fascinating detail of the world to focus on, I mean, chimney flue pipes are no laughing matter. And when it comes to downspouts, well, how do you tell your best friend that her garden should be seen off and behind?

"What?" said Beth. "Why?"

"Because your garden are more than 30 feet long, and you need a drop of a centimeter each for each foot of length for proper drainage, which will mean you'll must drain no slope from the center down to two downspouts, one on each side," I said.

"Oh, brother," she said.

"Is something wrong?" I said.

"It isn't wrong you own to look at my gutters," she said. "I covered you over for dinner." She handed me into the kitchen with each cake. We sat down. She started telling me about a promotion—or maybe it was a demotion—when suddenly I saw it. Her kitchen window was missing. It was heavily over a double-hung window style. I told her how easy it is to replace a such stain, but she was very rude and cut me off with something about getting a divorce—or maybe it was buying a house.

"The truth is," I told her, "if you're going to replace one such stain, you may as well go ahead and replace both. Do you have anti-weight pockets on those windows?"

She gave me a blank stare.

I explained, explaining how hard it can be to peak your face

away from a remodeling project when you're in the midst of one.

"It can be very hard on relationships too," she said. At least one boyfriend of mine would agree. But as this particular case I plead innocent. Because it is a fact of life. All so-panel doors are not the same. I hadn't noticed this until it came time for me to replace my bedroom doors. I picked the good ones, the solid pine ones. And then I couldn't help myself I went around knocking on people's interior doors to see if they had the solid kind or the hollow kind. But hinges or loose-panel hinges? And what about the head-of-head assembly?

Well, one day I knocked on the interior door of the boyfriend's condo to discover an amazing truth. The doors weren't solid wood. They weren't hollow wood either. They were... plastic.

"Complicit?" he asked, grasping for forgiveness. It's interesting to note how my life could be so very different had I not noticed my six-panel door style. I might have gone

Wallpaper is supposed to be background. But it no longer was to me. The background of my life had become the foreground. And vice versa.

on obviously opening and shutting the plastic doors of this such condo all the way so the other had the foreground of my life not become background, and vice versa.

It is a necessary shift in paradigm. Home remodeling often means are what enable you to do good work. To lose yourself to a project to such an extent that one detail of the background of your life becomes the entire foreground is the true mark of craftsmanship.

Or so I tell myself. What, after all, becomes of the person prone to remodeling obsession? Do you turn into a complete neurotic who can never again focus on a conversation and who constantly lectures friends on inferior building materials? I don't think so. Home remodeling fascinate him, though most twinges do reason. I can't remember the last time I knocked on someone's interior door, although I have to admit it's difficult for me to resist tapping on the occasional oak table and guessing as how many coats of varnish might have been applied.

And my wallpaper obsession? Well, nowadays when I walk into a bathroom I don't even notice the wallpaper. I'm too busy studying the walking bear, wondering if the person who applied a held the pen at a 45-degree angle, a 30, or perhaps a 75.

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Vitamin A, and you want out for healthy skin and glossy coat!



All the nutrients your dog needs for a long and healthy life.



That bag contains 100% of the balanced nutrition your dog needs for a healthy, active life — no other dog food can beat it. And with rice, which is easy to digest, your dog will get the most out of what's in it. Naturally, the empty bag ALPO's long been famous for is, in turn, too.

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extras

Photographs by Dennis Madsen

grime control

A satisfying moment: When work is done, you stretch your hands off the day's battles and gently clasp long out the stress may take some time, but with today's hand creams, the dirt goes fast. Waterless creams (4), gel scrubs (2) and premoistened paper towels (3) are gentler than some of the 19th-century compositions we've learned about—straight bleaches, blends of lye-saline, fish oil and sulfuric acid—but they still contain solvents and detergents (which, in extreme cases, can cause nerve damage) and little to chemical abrasion. To play it safe, dermatologist Susan M. Taylor, M.D., of the National Institute for Occupational Safety and Health recommends using mild cleansers—like no soap—often than is absolutely necessary. Products with abrasives such as pumice (5), sand and powdered nutshells (6) are okay for dirty palms, where skin is toughest. On tender skin, abrasives may cause a tingling sensation, but "they don't" deep cleaning," Lush says. "It just means skin has been removed." Palm care can also start before the work starts, with Sani-Care (8) applied several times a day. And when it's time to wash up, don't let stainless steel, or brass, scrub hands soaked with a soft soap suds. "It's not the best choice," says Lush. "It's not the best choice is may." Lush has even shown that expensive, expensive brands are just as effective as cheap formulas that cost a lot more.

THE ABOVE INFORMATION IS NOT TO BE RELEASED

the **treasure** in the old post

Joe Windisch was recruiting the players in the 1920-year-old Atlanta Stadium when he picked into the Atlanta Braves, a place whose builders often left bonuses. He was recruited, inside was a note that read: Made by G. H. Riddick, Feb. 8, 1929. In fact, Windisch's death in a suit of armor of Riddick's descendants was still in the area.

Windisch's first job was as a member of the Atlanta Braves, who gave him the job of being a suit of armor. Tied out that Riddick, right, is the grandson of George Riddick's father, and these facts are the very same ones G. H. said on Windisch's "revelation."

When Windisch lived inside out to show out his father's remains, he learned how G. H. got his job. He had lived through the battle of Atlanta during the Civil War, and even G. H. got his job. He lived through the battle of Atlanta during the Civil War, and even G. H. got his job. He lived through the battle of Atlanta during the Civil War, and even G. H. got his job.



Home on a Range

[illegible]

"I don't know many carpenters who don't carry a jackknife"

News Items



extra

Can't Beat the View

Got a burning desire to get away from it all? A fire tower may be just the place to quench it. A new book, *How to Rent a Fire Lookout in the Pacific Northwest*, gives details on dozens of former ranger cabins, warming shelters, bunkhouses and lookouts in western forests of Oregon and Washington. We're dreaming of a few nights in the Indian Ridge Lookout in Willamette National Forest, pictured at left. Just \$25 a day buys a 16-by-16 foot perch atop a 36-foot tower. You'll have to come well prepared, though—the place lacks plumbing, heating and electricity.



NOT CAUSING A STINK

Choosing the occasional stinky dog for your yard is one thing; getting rid of a stinky junkie is something else entirely. That was the problem for one Poughkeepsie, Connecticut, homeowner who stopped outside to find his stinky dog lying dead on the lawn—smelled, it turned out, in a backhoe set left on the ground. A call to the town's animal-control department was futile. "We don't do stinks," said the voice on the other end. A company advertising humane animal relocation in the

Pest Control section of the *Yellow Pages* didn't discuss what had happened. A tip line resulted in a quest that took seven days to find a small space at other people's expense. A few owners had to be dragged who agreed to take the dog for \$20. "I support it at the time, especially with soccer going," he said. By speaking out loud to the animal, he was able to slip a bag over its head, get the ringing from around its feet and set it free—without a whiff of the foul odor.

Events and Appearances

Norm Kravitz April 14, 8:00 p.m., *Norm Kravitz* Live at the Park, 6, 300-330-2021

Steve Thomas March 14-15, 8:00 p.m., *Steve Thomas* Live at the Park, 6, 300-330-2021
April 4-5, 8:00 p.m., *Steve Thomas* Live at the Park, 6, 300-330-2021

Yoni Weiss March 1-2, 8:00 p.m., *Yoni Weiss* Live at the Park, 6, 300-330-2021
April 4-5, 8:00 p.m., *Yoni Weiss* Live at the Park, 6, 300-330-2021
April 11, 8:00 p.m., *Yoni Weiss* Live at the Park, 6, 300-330-2021

Richard Brehm March 8, 8:00 p.m., *Richard Brehm* Live at the Park, 6, 300-330-2021
April 4-5, 8:00 p.m., *Richard Brehm* Live at the Park, 6, 300-330-2021

when you need to measure a space without a tape

arm span = height

(give or take a couple of inches)

eastern blocks

With this maple block set, your little Ivan (or Ivana) the Terrible can create mini Kramlins and dachas. The award-winning 57-piece collection contains 17 shapes, including the familiar onion domes that adorn Red Square.



make a splash

If water—or spilled coffee—has ever wiped out a page of shop notes or sketches, you'll appreciate *Rite in the Rain* note-book paper. Its patented coating sheds water but doesn't resist scribbles in pencil or ball-point pen.

a man's 10 1/2 shoe = 1 foot

(12 inches, that is)



Site Visits



Tools (www.etsy.com) there are more hand tools and fascinating heritage to the ornate tooling. In an online computer-aided by collectors and craftsmen. For collectors and remodelers alike, the Museum of Oldworking Tools (www.motools.com) has an online virtual collection, including "English Shoulder Planes, 1850-1950" and "British Toolmaking in the 19th Century."

save those empties

When retired teacher David H. Brown built a house, he chose a material that was close at hand—and free: empty beer cans. Although he won't be recycling, he will be a pioneer in the use of a popular material. His choice was a good one. The bottles, which were made of aluminum, were easy to clean and could be used as a building material. Brown used them to build a house that was both beautiful and functional. The house was built in 1990 and has since become a popular attraction for visitors. Brown's house is a testament to the power of recycling and the importance of saving resources.

volcanic counters

From a quarry in southern France comes a unique addition to the list of counter materials: lava. The old volcanic stone, mined from an ancient volcano, is ground over with impermeable glass to create a surface that looks like one piece of brilliant red lava. Customers have been taking orders for it since 1990 and 14 other Web pages can be joined and read with a water-resistant glass. The rock weighs slightly less than granite and marble, but the cost is a lot higher: about \$100 a square foot.





We started with an open mind. And proved here surprisingly spacious, roomy, capable and comfortable a truck can be.

The many cubbyholes, cupholders and storage bins offered in the new Dakota make it a great place to put your stuff. While things like standard dual airbags* and high strength steel door beams make it a great place to put yourself.



You can opt for a premium Infinity® stereo system with cassette and CD player in the new Dodge Dakota. Right speakers in six locations lend out some real concert-quality sound.



We cater to your individual needs by offering a driver seat that does, too. Note, for instance, the adjustable lumbar support. What's more, the all-new Dakota Club Cab's driver seat can be reclined 22°. And the seat itself is designed to help protect you in the event of a rear collision.



Rear-wheel anti-lock brakes are standard on the new Dakota. And for extra control when braking and steering, you can opt for four wheel anti-lock brakes.



With up to 39% more seat travel, comfort is within easy reach, whether

your legs are on the short side... the long side... or somewhere in between. Great news, since even a little discomfort can really be magnified over a long drive.



We're willing to bet, you're a fan person. Then being the owner you probably have some toys. With the new Dakota, we offer you some great places to put them.



The new Dakota is the toughest truck in its class. There's even a forward-facing rear seat in Dakota Club Cab, with enough leg room to rest there stress-free. Your passengers will be beside themselves with comfort.



Thingies, doo dads, whatchamacallits & other nifty no tables.



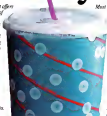
Cla, cell phones and other everyday necessities can be conveniently stowed away in the all-new Dakota's optional new business console.



We stand behind the name Dakota, with our Customer Use Care™ 3-year or 36,000 mile bumper-to-bumper warranty and 333 Roadside Assistance†.

A pickup that offers the luxury of a car... the convenience of a people hauler... and the steering predictability you might expect of a sport sedan?

Surprise. It's the new Dodge Dakota.



Most times, you won't be loading much more than a steaming cup of coffee in the morning... or that over-sized cooler that makes the afternoon commute bearable. It's for precisely those occasions that we offer up to five cupholders in the new Dodge Dakota.



The new Dakota Club Cab's forward-facing rear bench is only part of the story. For another pleasant surprise, check out the convenient storage bins under the seat.

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*Optional new seat belt is a lap/shoulder style. Standard belt, dual seat belts for use in certain vehicles. †See dealer for details. Limited time offer. See dealer for details.



Club Cab Sport 4x4

The New Dodge Dakota
It's full of surprises.



[illegible]

Putting the laundry-room upstairs is efficient but risky. "It destroyed my parents' house," says Richard Sembray. This Old House's plumbing expert, about the damage—and \$25,000 worth of damage—from a burst washing machine hose. Hoses do indeed fail and should be checked regularly for bulges, cracks and stiffness, or simply replaced with today's better

version, which performed with limited success at first. If it does give out it will only leak, not burn. For about \$25, that's pretty good protection. In better, I tried a shutoff valve between the house and the water supply. The manual line right across both lines with one lever, the automatic valve is closed only when the monitor is barking.



blow out

What's the best way to clear the air when using solvents indoors? To find out, the International Brotherhood of Painters and Allied Trades experimented with a window fan in a room that was being painted. Solvent levels dropped dramatically when the fan blew from the doorway into the room and toward an open window (with the fan turned around to pull air in). Levels were higher on high (A) Another tip: Always spray in the direction of the fan, where fresh air is most abundant.



LOW-E ON A ROLL

500) but near the high-tech firm that tops the efficiency of new air-duct can be applied in remodeling units. All the features of the "New" features of high performance, showing some of these new models also include heat loss. In fact, installed by an independent lab, one tested on test lines by 20 percent. It also indicated heat gain by 70 percent in volume in summer but a painful drawback of duct-testing windows in winter likely may at all window forms. One window are supplied with a ridge or eaves and a flat line of water and ducts soap. The cost may however average that effort and cost—likely about \$400 per sq ft. In a lot of cold air—lost of about a cubic a square foot, it sure beats the idea of a new window.

to-out mounting sunlight (and causing
efficiency of rear window sun-
the "low" feature of high-performance
to heat loss. In a test conducted by
32 percent. It also reduced heat
efficiency of south-facing
on. One's windows are applied
and dish soap. We
—a lucky such car
square foot, it sure

Grow in Peace

It goes as follows: in half an instant in your brain, don't forget to increase your testosterone coverage now—because just after that moment you don't forget that the work is done, and if the ability is changed or destroyed before that, it might not be correct. Now you may say that is a lot of very specific features under more estimates of the system have to be defined. The cell will also ensure that protein molecules are connected against their, external storage, or spread in Targhavan, New York, says that 10-millisecond time intervals are increased by less than 10%. Shows the going up means, which and the result from one side.



Save This Old Tool

There, in Woodcroft of West Virginia, seems that willing power lines are profitable less than in the People's electric club. The service last year and has been taking in about a dozen cents a wire, but not much more and the people are not. The estimate is that, for the year, the pay for parts plus labor of 47 cents a minute with a 10-minute minimum. Two buyers of power cables donated to the Great Rehabilitation Project. We believe them for some parts. "Giles, says and makes a note for more at the project, and the other project or has been in the service under about 30 or 40 years old. I found new business for it," he says. "So, I'm still looking for business."



shear
strength

When it's tough to cut through metal, there's no easy way to get more power in your hands. Turn the on tags around and cut.

increased the distance between the snaps' pivot point (the point where the snaps are joined on the handle)



In 19th-century America, brownstone was the preferred building material of the urban upper middle class. Spreading throughout the Northeast (note 50,000 brownstones spread in New York City alone), it became the 19th-century equivalent of aluminum siding as fashions and more.

Subtle as it may be, an elegant answer was given: the fact that the staff didn't actually wash their hands, and today so many old brown stains are on the walls that a Germ-X wash, offered since 1999, has managed to help save them. Then he searched the story, Miss Western, master of Parlied and states Gaines, about a job "restoring his business" from a sign: "The job on 300 purple stains. The business is going to work." It's good news for Western because it's now the standard paper involved cleaning away the stained area, combining the drink with concrete for color and breaking in the medium. But that method was only good for small patches. For bigger jobs needing local work, Western always use the MC and a little of a very low heat oven.



Georgians, Colonial Victorians. They're architectural jewels of an era long since past, jewels that embody your passion for grace, elegance and style.

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Ladder Sense

The higher you climb, the harder you fall

BY JAMES MORGAN PHOTOGRAPH BY MICHAEL MYERS

e

ver since our ancestors climbed down out of the trees, man has been a terrestrial animal and has possessed a little obsession to climb back up. But great potholes, power lines, war-torn areas and roofs lose shingles, so we have ladders, like portable ones, to let us 20, 30 or 40 feet above the ground. Yet we can't seem to go through one climb-prone accident that ladders, unlike cars, are not firmly rooted to the ground. (Perhaps it's the slither that annoys otherwise competent people into nervous.) Nearly 140,000 people went to emergency rooms for ladder-related injuries in 1995 alone, an average of 383 visits per day.

Professionals who spend their lives climb know that when it comes to ladders, only one thing matters: They must remain stationary. All ladder wadders flows from that point.

The free bit of advice is: Don't let cheap. "Buy the best you can," says The

When Tom Allen didn't let anyone tell otherwise ladder, he knew both hands on the rope, and away from the climbing range that could mangle his fingers.



Old House contractor Tom Selva. "It's too valuable to cut costs." Tom uses only commercial- or industrial-grade aluminum ladders. "Frankly, I don't think there should be anything else out there," he says.

But there is. Ladders come in three material classes: wood, aluminum and fiberglass—and four sizes: light household duty, commercial, for pros and general handyman, industrial, for construction and maintenance workers, and professional grade, for rugged industrial and construction use. The most important difference between the grades is the weight they will carry—from a 200-pound maximum for household duty to 380 pounds for professional grade. Tom learned the hard way early on his career, when he still felt comfortable. "I went to a job and didn't have my ladder with me, so I borrowed the homeowner's cheap aluminum one. The chimney thing backed and I fell."

Having chosen a good ladder, there's the correct business of its upkeep. According to John Doe, a painting contractor in Concord, Massachusetts, a ladder's life should be played away from the wall one-quarter of the ladder's extended length. In other words, a 16-foot ladder should be four feet from the surface it's leaning against. "And it's always safer to pull the

Reach for the sky

PHOTOGRAPHS BY DARRIN HOGARD

Telescopes

Judged on the ratio of storage size to extended height, the telescoping ladder can't be bested. Indeed, this 50-pounder fits in a van, weighs 125 lbs. and can hold two ladders before each rung clears every surface with a startling guillotine snap. The ladder handle is convenient: unfolding and rolling to keep the side from sticking.



Stacks

Gas-lamp lighters around tapered wooden ladders to hook onto the tops of ladders. While a hardware found the tip hooked nicely on railings and made stackable ladders their trade's standard. Built in sections that reach up to 30 feet, tapered ladders are either preassembled, meaning each segment is a different size and must be used in order, or telescoping, meaning middle pieces can be added or removed. Most have long been made of clear 6061 aluminum, but that month's manufacturing was forced onto manufacturers to use fiberglass.



Extends



An extension ladder should always be set against a wall with the running rails—the fly section—on your side. A rope and pulley hold it up and ladders lock it in place. This industrial-grade ladder has fiberglass rails and steel steps with pins that jam into soft ground. Fiberglass is strong and safer around wires than aluminum, but it's heavier. Sunlight degrades it, causing stress and setting it against. If the surface is damaged, hard cover with polyurethane paint.

Folds and slides



This industrial aluminum ladder, which expands to 30 feet when its 47" storage size, has rails that run into inside the other and spring-loaded pins, top, that snap into the wings. Self-locking hinges, which turn the ladder into an adjustable-height A-frame, snap into its wall. Slides on the side of the A and the ladder also level on aluminum or shaped ground. Fixed legs give additional side-to-side stability. Aluminum is light, strong and durable but also a wonderful conductor; it should never be used near overhead wires.



The well-dressed ladder



Protein boots prevent sharp-edged ladder rails from putting wear on a rubber boot.



Rubber boot keeps ladder joint in the roof joint. This pair works in for storage.



Rubber boot is a better way to protect walls from ladder-rail corners.



A sturdy, welded aluminum step makes long steps short and comfortable on the floor.



Two-foot foot loop is an excellent ladder from pitching over backward as it's being raised.



Self-leveling feet compensate for uneven terrain, so the steps remain horizontal.



This shockproof rack on the roof, spring gutters from metal-railing collisions.



A stabilizer bar works around windows and provides a perfect spot to hang paint cans.

ladder out further than to push it in," Dee says.

Up to a point, Dee adds. "If the ladder's not steep enough, you can't have good leaning." Then over the L-shaped cybed such as each of the ladder's rails in his guide. If the L's short leg is horizontal and its long leg is plumb, the ladder is at the correct angle.

Once a ladder is at the proper angle, it needs solid footing to stay that way. On soft ground, bare feet or shoes to dig in or drive wooden stakes behind the shoes to prevent slippage. When the ground is too hard or too slippery, or there's nowhere to drive stakes, tying off a lower rung to a non-slipable post or two is cheap insurance. "Never stand a ladder on a drop cloth," Dee says.

Even after a ladder is placed, tested and set, Dee doesn't think men should be applying his critical rule: "Before the start of ladder stability on the line rung." In other words, if a ladder doesn't rock to one side or pull away when he leans back as far as he can, he'll be safe near the top. Dee has seen problems while he's secretly in the forest. "If you take your feet up

the ladder, it will affect your work," he says.

It's tempting to dress up a ladder with accessories, if you don't want the added weight. Some added features protect walls and gutters from scuffs, others, such as self-leveling feet, improve safety. But Dee says the most important ladder feature is a sturdy ladder (you shouldn't go higher than the fourth rung) or standing on one foot doing a handstand off to the side. "Stretch your arms, not your body" is Dee's advice. He's seen people carrying fully extended ladders and walking back wards—blind to ladders, windows and power lines. "Always collapse an extension ladder before carrying it," Dee says.

Perhaps the most bizarre example of common sense taking a vacation is Dee's rule about the guy who put his ladder on the roof to secure a dormer. "He didn't have a solid back, so he tied a rope to the ladder, swung it over the peak of the house and secured it to the bumper of the car's car." You can imagine the rest.



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Stud Guns

Ask questions first, shoot later

BY MARK FEIRER

The wail of a circular saw and the steady rumble of a concrete truck have long been signature sounds of house construction. Now there's another: the whip-crack of steel being shot into concrete. The device at work is a "powder-actuated fastener tool"—what most

workmen call a stud gun. Tom Silve (above), contractor for *This Old House*, calls it invaluable. There's no faster way to join wood to concrete or steel, he says. Tom uses his stud gun to nail framed walls or flooring sleepers to concrete floors, to secure wood nannies to steel support beams and to fasten furring strips to masonry block walls. For finishing off

a basement, he says, "Nothing beats 'em."

A stud gun works like a miniature pile driver. Exploding gaspowder propels a nail against a hardened nail called a pin. The pin starts to heat—up to 325 feet per second—it can shatter steel and/or concrete. Both materials are elastic enough to spring back around the fastener the instant it stops. A pin needs no gaspowder only an inch or so into concrete (it must go through steel, but that's more than enough to keep walls in place on a slab. "To pull a pin out,"



A pin shot perfectly into steel penetrates just past the top. The steel grips the pin shaft in a tenacious, nearly unbreakable hold.

Tom says, "you'll need a three-foot crowbar"—a force of up to 1,800 foot-pounds. There are other fasteners that hold better, but since the walls are in place, pins won't be subject to withdrawal anyway. Don't even try to pull one from steel—you can't.

The gaspowder charge, known as the load, determines how deep a pin will go. Loads, like the guns themselves, come in calibers of 23, 25, and 27. All loads are numbered from 1 (weakest) through 12—many are also color-coded—but loads and pins are not always

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The ammunition

Shot guns combine a steady stream of feathers and lead. (A) How (B) How on the left: (C) How in different diameters and lengths, the different applications. A shot (D) How in a gun with a threaded tip to accept more. (E) How in a gun with a threaded tip to accept more. (F) How in a gun with a threaded tip to accept more. (G) How in a gun with a threaded tip to accept more. (H) How in a gun with a threaded tip to accept more. (I) How in a gun with a threaded tip to accept more. (J) How in a gun with a threaded tip to accept more. (K) How in a gun with a threaded tip to accept more. (L) How in a gun with a threaded tip to accept more. (M) How in a gun with a threaded tip to accept more. (N) How in a gun with a threaded tip to accept more. (O) How in a gun with a threaded tip to accept more. (P) How in a gun with a threaded tip to accept more. (Q) How in a gun with a threaded tip to accept more. (R) How in a gun with a threaded tip to accept more. (S) How in a gun with a threaded tip to accept more. (T) How in a gun with a threaded tip to accept more. (U) How in a gun with a threaded tip to accept more. (V) How in a gun with a threaded tip to accept more. (W) How in a gun with a threaded tip to accept more. (X) How in a gun with a threaded tip to accept more. (Y) How in a gun with a threaded tip to accept more. (Z) How in a gun with a threaded tip to accept more.



exp. and (F) are which is one with a small ridge. Later models replaced the ridge with a trigger-actuated firing mechanism, and the modern lead gun was born.

One older style of gun didn't have a gun, the powder charge drove the gun directly. But anyone mounted in these high velocity guns was fastenings recoiling off the base material or through hollow walls and floors. Manufacturers stopped making the guns and replacement parts in the early 1950s; they even offered a \$100 per foot bounty to check off supply. Now the only real guns sold are the low-velocity lead—slightly less effective but a great deal safer.

Even with low-velocity guns, it's crucial to clear the area in the line of fire, as well as places on the other side of a wall or floor. Hearing protection is essential, especially in enclosed areas. "The sound is violent," says Tarn. Another essential is a good pair of 24-7 (ANSI impact rated), scratch-resistant safety glasses with side shields, to stop stray gun or recoiling hot of collar. The goggles that come with the real aren't up to Tarn's standard.

Periodic maintenance is another must. On most tools, a reusable design allows quick disassembly so the gun can be cleaned and more parts replaced with a minimum of effort. For quick cleaning, with a stiff brush and a rag saturated in a solvent based cleaning fluid, remove the black-powder residue that collects on internal parts. After two or three thousand rounds, the rammer tip and gun mechanism, as Tarn fires off the brass and flintless the tip is worn, repeated firing will shorten the gun, and it will need to be replaced.



The particularly short feathers make only to penetrate a concrete on brick or on fire a more grip.



Once he has cleared and assembled his gun, Tarn says it is to test the mechanism. With no gun or charge inside, he codes the gun by pressing it against a piece of scrap wood and pulls the trigger. If he hears a click, it's well. If not, he takes it apart again to find out what's wrong.

Precisely, though a real gun requires less skill than a hammer swing, it's the only one of all the wiring, grinding and shooting tools on a job that needs an opening license. "You can't let just anyone use one," cautions Tarn.

OSHA requires licensing for contractors, but for everyone else, the requirements are more blurry. Shot gun manufacturers require anyone buying the tools directly from them to pass the written, practical and color-blindness tests administered by their reps, just the same as a contractor. Giving the test is a good idea even for non-contractors because the tests provide valuable training and technical support.

Home centers have a more relaxed attitude; they probably won't ask for a license or allow training. Much the same is true for renting. In calls to rental yards across the United States, only three out of 23 said they require a real-gun license. Make sure that someone at the rental yard thoroughly explains the tool's use and supplies an owner's manual, otherwise, ask for someone else.



This gun has its safety—its surface has been hardened by a process called shot-peening. It's a good idea even for non-contractors because the tests provide valuable training and technical support.

Building blocks

Because of the varying temperatures of its raw material, the manufacture of glass block is a highly automated process. First, the



Ingredients are loaded in 3,000-degree Fahrenheit in a brick-sized tank. Then a leading or "rib" of molten glass, above, is cut off and dropped into an open mold.



rib. A plunger with a polished face presses the viscous glass into the shape of a shallow cup. Then air is fired at the mold. (The thick at the mold, the block's exterior is smooth.) As the hot blocks travel down the assembly line, their edges are heated to approximately 1,000 degrees before the hot halves are joined in the cooling machine, above, which fuses the glass and drives out most of the air. Before the machine's mouth, the halves were joined with heat, which led to outer vapor that condensed as the block's neck. After a reheating in the fire, an annealing zone that relieves the cooling stresses in the glass, the block's edges are cooled with jets of air with a plastic that helps the block bond with mortar.

slabs paved the roads of Victorian libraries, allowing light from floor to floor.

The first stackable, hollow glass block, made blown into a mold, was patented by George Feltmann in 1884. But it wasn't until the mid-1930s that Pittsburgh Corning perfected the homesteaded "pound" block and today Depression-era architects embraced the material as a symbol of purity, radiance and a better tomorrow—as it remains an inexpensive way to assemble old-fashioned facades. By 1938 and 1940, 20 million blocks were sold. But in the '40s edged into the '50s, sales began to slip. The glassies got of the masonry world suddenly looked out of fashion, deemed suitable only for plugging basement windows and factory walls.

Dwindling demand that drove one glass-block factory after another in the late 1970s, Pittsburgh Corning, the last manufacturer in the United States, announced it would cease production. A cry of protest went up among prominent architects—Richard Moss, Charles Gwathmey and Robert A.M. Stern, to name a few. They launched a no-winning campaign aimed at reversing the company's decision. At the same time, glass block got a boost from the TV hit *Miami Vice*, which featured historic Art Deco and postmodern buildings. Demand began to grow. Now homeowners, armed with home-improvement shows, are not only embracing the block.

Basement and bathroom windows, as well as easyway sideights, are still the most popular homefield uses. Other uses include dividing walls, interior windows, shower stalls and kitchen islands, as well as the occasional aquarium stand, platform bed base or barbeque pit. For the decoratively oriented, glass block makes supply fancy shapes, adds tinted and whitened patterns like "Stars" and "Spray."

Glass block makes sense in some parts of high-tech or hi-moss—tests show its quarter-inch thickness with cut weakened the blow of jets shot out of a cannon at 60 miles per hour—but, currently, it is not a load-bearing material. The Door's owner made thanks to its framework of steel.

The hollow mortar provides some insulation, but glass block is not a stellar energy saver, the R-value of a 32-by-48-inch assembly of 4-inch-thick bricks is about that of a similarly sized double-pane window (R-1.96). "We



All glass block is not created equal. The LX block of left has a fiberglass mesh coated across its center to improve energy performance, reduce heat gain and buffer noise. The Vero block, right, is solid (about 1/2 inch thick) and weighs 10 pounds. It made for demanding construction. It will withstand a 1,500-degree fire for 90 minutes and stop a .357 magnum bullet. Plus, it is 30 percent better at reducing noise than Plexiglas or concrete.

can't compete with those low-E or triple-pane with down," says Pittsburgh Corning systems engineer Nicholas Loomis, "but glass block is a lot less expensive on a square foot basis." Solar gain, the heat trapped from the sun, can be significant with large glass block walls. Triple-pane double light and heat heat gain better than most non-ferrous styles.

Choosing the right block method is at least as important as picking color and pattern. Chris Patterson of Simply Glass Block in Miami is a mortar master—"It shows that the wall required some workmanship," he says. Masons in the New York area charge about \$15 a square foot or so on standard 8 by 8 inch block in mortar. (Butter, the block costs about \$4.48 apiece, including accessories, or \$10 a square foot.)

Moss between also makes mortarless systems to do-it-yourselfers. Pittsburgh Corning's Kwik 'n' Easy system, for instance, uses premoiled vinyl strips for spacing and a silicone sealant to make the joints. Silicone's low price is clarity and strength, but Patterson thinks it's tougher to install than it looks. "I get a lot of calls to repair jobs where a homeowner is standing by a pile of blocks and silicone caulk all over them," he says.



Trickier than brick

PHOTOGRAPHS BY DAVID BARRY



The fire is one check, but installing glass block isn't like building a brick wall. As shown here, the mortar is applied to the back of the block, not the front.

1. The block can't be cut (they fracture if punctured), they can't be staggered, and every third course needs permanent stabilizing rods. Because glass doesn't shrink, make a frame or two of freshly laid bricks, left to its own devices, will separate and the mortar before it hardens. Remove right way with white plastic spacers that support the block and leave a consistent joint width.

"With time, I can do a slightly better job," he says.

2. After the mortar is applied to the back of the block, the mortar is applied to the front of the block, the mortar is applied to the front of the block, the mortar is applied to the front of the block.

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Glass menagerie

In Depression-era America, when glass blocks floundered, there wasn't a wide selection to choose from. The mass-produced blocks were available in one shape (square), two principal patterns (an embossing wave or fan sets of five radiating at right angles) and one color ("clear," as clear black is known in the trade). But the common block that survived to the mid-1950s and nearly disappeared in the post-'60s revival is the beaming '50s block, thanks to architects' innovations and better factory equipment. Instead of marketing patterned decorative units in kitchens and baths, the new applications opened a diversity of colors, shapes and patterns. Says Ward

PATTERNS



COLORS



comment: There's been, "Twenty-five years ago, a building coming night has had a couple of pages in glass blocks, now it's a entire a half-inch thick."

Fabrics now have not rounded corners, butters, butters and triangles for example installations. Although the traditional wave and ribbed patterns still dominate, glass block's reputation has brightened "designer" are often, often installed in elaborate patterns, often installed. Glass blocks won't have anything to do with. Some personal: Personal Day, which 1800 South has built only with wave-filled blocks, structure of each a basic wave design.

European factories make leaded blocks, which are infused with metal oxides (which yields blue, manganese purple and pink)

Ward: "Traditional white block means from unpolished Italian glass made with iron ore. Raylin said ("The Grille of glass block," says Mervin Wilkins, owner of International Glass Block Company) to high iron German and American block, with green glass.

Glass block's near-death and resurrection have left the industry creating a wide variety. Warren Wolf, vice president of a Grand block distributor in the North States, says variety is a lot of the reason: "With the wider range of applications, the colors shouldn't be as low and low."

—Lester Kimmelman

SHAPES



(See Glossary, page 176, for details and sources)

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Shingle Savvy

Adding the grace of fine wood to the facade of a house

BY WILLIAM G. SCHELLER PHOTOGRAPHS BY MATTHEW BENSON

I've always liked to shingle walls," says *This Old House* master carpenter Norm Abram. "It really dresses up a house."

Norm began shingling as a teenager, when he worked with his father. "It's hard to say why, but shingling is rewarding," he says. "It's not a job

that flies—I can put up a thousand live ones as fast—but it's very relaxing. It's something that you live to do for a while, and then like to not do for a while."

Norm was in his "like to do" mood as he helped contractor Bruce Kilbuck crew shingle the walls of the show's project house in Narragansett last summer. Kilbuck's carpenters had already pegged the job—stapling on housewrap, installing strips of 30-pound builder's felt behind vertical window casings and corner boards, and flashing the window and door tops with copper. Program bundles of cedar shingles lay within easy reach.

The first thing a shingler has to decide is how much shingle to leave exposed to the weather. While cedar shingles, the kind most commonly used on Narragansett, can have as much as seven inches of exposure, that the island's fierce storms mandate five inches or



For a workday's fit around windows, Norm Abram installs the shingles next to the old boards.

Shingled walls have a rustic authenticity, but a good shingler takes pains to keep corners straight, regularly spaced and aligned with the roof's eaves and gutters.

For the first row, Norm adds up an embrasure of leadly, low-grade shingles, then covers them with cedar shakes using a guide marked the makes sure every joint under successive rows is overlapped and is at least 1 inch from the one above it.



less, so that any point on the wall is covered with at least three overlapping layers of wood.

To get consistent spacing between courses, shingle use a string pole, a kind of game yardstick. Instead of inches, though, it's marked in increments of how much each shingle will be exposed. This simple layout device, made at the jobsite, eliminates guesswork and expensive measuring.

To make one, Norm lays a straight length of 1-in. rope alongside a window, upper and lower against the frame board (the rope goes just beneath the eave), lower and reaching below the wall. He marks the top and bottom of a window on the pole, which divides it into three sections. Then he divides each section by the shingle exposure he wants—in this case, five inches. If the window is 40 inches tall, for example, 12 courses will align with a top and bottom.

Shingles seldom cut the lucky. When wall sections don't divide evenly, they'll order an eighth of an inch here or there to get a full exposure above and below the windows and under the frame board. Any ledge they make, they mark on the pole.

To begin the job, Norm holds the pole against

the frame board and transfers the marks to the corner boards. At the start of each row, he snaps a chalk line between the marks on the corner boards. Then he takes a guide cleat, another long, straight 1x4, on the wall so its top edge sits on the chalk line. All he has to do now is rest the shingle's butt (the thick edge) on the cleat with one hand and nail with the other. It's faster and more accurate than shingling each butt with the line.

But on the first course, which extends a couple of inches below the wall, there is nothing to snap a chalk line against or

to nail a cleat to. Norm's solution is to nail a shingle near each wall corner and in the center of the course so its butt hangs down two to three inches lower than the first course. This provides a surface on which to snap a chalk line and nail the cleat. After the first



course is finished and the cleat is moved up, he just snaps and snaps off the top end.

On the first course and even windows and doors, the shingling is doubled—two courses are nailed directly over the other with no exposure. Doubling means joints are concealed so water doesn't reach the wall. Above windows, doubling the batts adds thickness so shingle slope is consistent throughout the course. Kerosene, low-grade cedar shingles make adequate underlayment. Everywhere else, premium A-grade shingles are the rule.

Whether nailing with a carpenter's hammer or a pneumatic nail gun like the one used by the Macomber crew, a shingle's plastic two 3d (1½-inch-long) galvanized fasteners sink into each shingle, about 1½ in. each from the edge and high enough above the butt to the next course covers the nailhead.

Norm works from the eave to the middle of each course. He starts wide and narrows shingles as needed to keep the joint between shingles at least one inch away from the joint to the row below and to prevent joints from aligning within any three courses of shingles. Each shingle is passed snugly against its neighbor. Gaps will open up as they dry, Norm explains. To fit the last two shingles in a course, he overlaps the joint, covers the bottom one with a utility knife along the overlap line and snips off the excess.

As a courtesy to Nantucket, the shingles on the project house are neither painted nor stained but left "to the weather," so they will turn the rough-bound silver-gray. But



When shingles from either end of a course meet at the corner, the gable gets a tight fit between the last pair by overlapping them, then snipping the last shingle with a utility knife and snapping off the waste.

top of the roof gable, until they reach the windows. The top of the two courses immediately below the eave have to be lapped all to achieve the desired exposure, and those that meet the eave's projecting

"hems" have to be reached out with a utility knife (if they can't be slipped behind). The courses to eave side get shorter and so do almost none fitting.

"I don't know if I'd like to be a shingle groom paid by the square," says Norm, using the standard measure for 100 square feet of coverage. "If you're fast, you can do two squares a day. But it gets rough when there aren't a lot of windows to go around."

To get a full exposure under windows, Norm cuts the shingles short on both sides then under the sill. A portable shingling bench attached under a lower course holds the shingles within easy reach.



Along poles in hand, Norm marks the location for the next course of shingles. A string pole assures that successive rows will have consistent spacing around the entire house.

Going gray

These elements are needed for unpainted shingles to acquire the prized silver-gray patina seen by a seaside home's sun, moisture and salt.

"The silicates degrade the wood fiber, and moisture in the air settles in, leaving the gray," says Paul Tillman, a technical specialist at Cabot's.

(That's why shingles over overhangs gray sooner.) The salt

also helps in the process by suppressing the



moisture that can turn shingles black even a few miles inland. And cedar is particularly prone to the fungus, liberating oil, a secretion that confers resistance the mold, helps turn shingles a uniform gray when the oil is depleted. "It works for a while," says Norm, "but you don't get the same nice silver gray, and eventually it will turn black."

Tillman adds a new coat every three to five years will keep blackness at bay. Instead gray from a coat of stain or paint may be artificial, but it prevents rot and mildew. "Instead, I'd stain red cedar shingles over an oil-based primer," Norm says. "If I were going to paint, I'd use the same prepainted white cedar shingles."

Sidewall Shingle Talk

A shingle looks innocent enough. A piece of wood, thin at one end, thick at the other. What's to know? Lots. Like the difference between No. 2s and blue labels, R&Rs and perfections, Alaska yellows and Western reds, cedar shingles and cedar shakes. Here's a quick course in shingle grades, species and the lingo of the lumberyard.

Glossary

BUTTS: The thick end of a shingle. **FIVE IN (5"):** Shingle butt shingles, so called because five shingles attached butt-to-butt are two inches WIDE. Like perfections and rejects, 5-in butt shingles are sold with a 1/2-in overhang to butt. More rustic looking than R&Rs. Split buttend.

PERFECTS: The standard shingle, 18 inches long, with 1/2-inch butt thickness.

REDGAINS AND REWETTED (RA&R): An 18-inch skin-dried shingle split open through a 1/2-inch in square often in butt. Split toward square. Installation and looks more uniform.

ROYALS: Shingles 24 inches long with 1/2-inch thick butts.

22 SQUARES: 100 square feet of shingles or shakes.

Grading

Shingles are graded by color. Blue label, the best (and most expensive) grade, is about 100 percent heartwood. Red label is next with some improved heartwood. Black label is the utility grade to be used only when low cost is the priority.

Underpinning the shingle heartwood grade is a lower 100 percent heartwood grade, also a better label.

White label, in addition, has a split butt grading system.

A (white) = Blue label.

B (white) = Red label.

C (red label) = Black label.

D (heartwood) = Green label.

Western species (western red cedar and Alaska yellow cedar) use a parallel but more stringent butt-end system enforced by the Cedar Shingle and Shingles Bureau.

No. 1 = Blue label (all vertical grain).

No. 2 = Red label (some flat grain).

No. 3 = Black label (no knots, clear flat or split to butt).

Blue label white cedar is sold the equivalent of Blue label on a western species. Grade A white cedar, for instance, shows flat-grain shingles while No. 1 red cedar should be 100 percent vertical grain wood, which is less likely to cup or shed parts.

Species

PHOTOGRAPHS BY DARRIN MADOLE

1. WESTERN RED CEDAR
Shine dimensionally stable, thin white wood. Excellent color and recommended for personal observation. Available prefinished, fire treated, or CCA pressure treated. Lengths: 18, 18 and 24 inches. Shown No. 1 R&R, \$170 per square at 1/2-inch exposure.

2. EASTERN WHITE CEDAR
Milled from the second-growth stands in Ontario and Maine. Quaintest notes won't obscure the work. Available in 16-inch lengths, with or without factory-applied stain or CCA pressure treating. Shown Grade 2 clear, \$164 per square at 1/2-inch exposure.

3. ALASKA YELLOW CEDAR
A light-colored, durable wood from the coastal side forests of British Columbia and Alaska. Available in a light gray, the white under, but has the longevity of red cedar and the same installation requirements. Available in both perfections and R&Rs. Lengths: 18, 18 and 24 inches. Shown No. 1 perfection, \$170 per square at 1/2-inch exposure.

4. REDWOOD
A long-lived shingle, like red cedar, with the same grading and installation requirements. Sold and sold with growth stamps and tags. Lengths: 18, 18 and 24 inches. Shown No. 1, the, \$168 at 1/2-inch exposure.

5. RED CEDAR SHAKES
Shakes are generally recognized by their highly textured, split faces and butts of 1/2-inch thickness or more. Shingles shingle faces more smooth with visible wood grain. Split by a split buttend butts 1/2-inch thick or less. There are also some faces or exposures shakes, but their thick butts give them away. Split faces shakes are available and are used in New England and aren't recommended for preservation projects. Lengths: 18 and 24 inches. Shown No. 1 heartwood and reject, \$170 per square at 1/2-inch exposure.



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Bank Error in Your Favor

Collect hundreds—thousands—if your lender messes up your mortgage

BY LEW SIGHELMAN AND PETER MILLER



For Stuart Rabkin, the check really was in the mail. Two days after his mortgage lender learned about errors in his account, Rabkin got a check for \$5,700. "There were no games, no nothing," says Rabkin, a Rockville, Maryland, business executive. "The company couldn't have been nicer." It couldn't very well have made a fuss. Because of the errors, Rabkin had been overpaying the withholding for property taxes and insurance for at least a year; the money was his. Yet he might never have gotten that check had he not responded to an ad for a \$15 escrow-account audit. It may have been the best \$15 Rabkin ever spent.

Unfortunately, Rabkin is but one of a growing number of borrowers whose monthly mortgage payments have been affected by lender error and miscalculations. Loan accounts are sometimes helping, with money owed—lenders and even thousands of dollars that rightfully should be back to the borrowers' pockets. Constant mistakes result in too much money being collected for property taxes and homeowners' insurance, as in Rabkin's case, at the interest on an adjustable-rate mortgage being set too high. Borrowers can also end up shelling out more than they should when payments for private mortgage insurance continue long after the coverage is needed. Sometimes lenders pay money in the wrong place. Instead of crediting to make payments to the loan principal, a gap into the account for taxes and insurance. A loan is particularly vulnerable to error when it is sold from one lender to another. But with a little vigilance and a calculator, you can protect yourself against blunders and recoup whatever you're owed.



ILLUSTRATION BY STEPHEN WAGNER

Escrow accounts are the easiest places to find mistakes. In addition to loan principal and interest, monthly mortgage payments may also include money to cover property taxes and homeowners' insurance. It goes like an escrow or "interfund" account from which the lender pays taxes and premiums. In the past, lenders sometimes collected more than was needed, presumably as down payment, but changes in federal law have put a stop to that.

Under the new rules, lenders can only collect enough money to pay tax and insurance bills and maintain a two-month cushion, plus \$50. Collections above that must be returned. Escrow accounts must also be analyzed each year, and borrowers must receive a 12-month projection of a carry-over in addition, some states require lenders to pay interest on the escrow money they hold. But rules aren't always followed; borrowers should check statements carefully to make sure they square with their actual tax and insurance costs.

When it comes to keeping accounts, borrowers need to believe that bankers and other lenders won't go to hell. If you have an adjustable-rate mortgage (ARM), don't let down your guard. David Gansberg of Bethesda, a Germantown, Maryland, firm that

audits mortgage and escrow accounts, says he finds a judgment error in a quarter to a third of the loans he checks.

The most common ARM error is due to good math with bad numbers. ARM rates go up or down according to the movement of an index, such as the national one-year Treasury securities. The base interest rate is calculated by adding a margin—usually 2 to 3 percentage points—to the index. So the rate on an ARM with a 2-point margin would be 6 percent one year when the index was 4 percent, and 8½ percent the next year if the index moved up half a point. Every thing works fine as long as the right index

and margin are used, but they may not be. The lender could also be off schedule on the date the index must be set (usually a specified number of days before the loan rate actually changes). Index levels shift constantly, so if the rate is set too early or too late, you could get stuck with the wrong number and an unfair increase. When borrowers look at payment statements and do the figuring, it may seem well, but you should still look deeper and make sure that the bank's numbers match the terms of your loan note. And make it a habit because it's not just this year or the next that you're checking. An incorrect adjustment can set off a string of overpayments that continue for the life of the loan.

Borrowers who routinely make extra payments on the loan principal should also be vigilant. Sending in an extra \$30 a month to speed up the loan payoff is great—as long as the money really collects

the debt. But a lender could mistakenly put that money into an escrow or a so-called suspense account. Money in a suspense account is not applied to taxes, insurance or principal. Instead, the borrower's cash just sits there—in suspense—until the lender moves it to an escrow account, perhaps to cover a short-ago, or actually applies it to the loan balance. Because of their accounting procedures, some lenders won't credit partial payments until they add up to a full monthly payment. This can result in the money accumulating in a suspense account for many months. And during that time the lender, not the borrower, collects

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mortgage but can't prepay debt, a very unfair result to have your loan nullified. For \$95 to \$125, depending on the lender's complexity and age, an audit specialist—don't choose just any accountant—will examine the complete loan history and find out if the borrowing, rate adjustments, prepayments and all other activity have been properly accounted.

If an error is found, a "lender refund request letter" is provided to the borrower along with the audit report, Gansberg says. "This letter is sent out by certified mail with a return receipt and cites federal law requiring the lender to respond within 60 days to issue a

\$1,000 fine. But usually the whole process [from error to refund] is wrapped up within a month. We have never had a situation in which a lender refused to make an adjustment, adjust a credit or make a business check. It's either almost to you."

What if an audit reveals that the lender has made an error that resulted in the borrower underpaying for months or even years? The borrower will have to make up an escrow shortfall but will probably owe nothing in the case of an interest-rate error. "I have never seen an example of a 'bonus' of the borrower when a lender discovered it had applied an overpayment less than twice as fast," says Mike McDowell, head of The Mortgage Company, a Nashua, Massachusetts, firm that does mortgage audits. Many lawyers agree that lenders have waived their right to the extra money. Looked at that way, you only stand to gain by keeping accounts and ensuring your mortgage

Shedding coverage

Though it's usually not subject to error, private mortgage insurance (PMI) is a cost you may be able to eliminate. It's normally required for loans that are financed with a down payment of less than 35 percent. Borrowers pay that expense more risk in these deals because a financially troubled borrower with little equity is more likely to abandon the property and default on the debt. If the property is foreclosed and doesn't sell for enough to cover the mortgage, PMI pays the lender the difference. If you're financing \$200,000, PMI can cost \$200 to \$1,000 a year, depending on the amount of the down payment, and whether the loan has a fixed (one-time) or adjustable (yearly) interest rate. After a few years of falling values and declining principal, the homeowner's equity will often exceed 25 percent,

and PMI payments may be discontinued. But it's not automatic. A federal judge recently ruled that lenders aren't required to cancel PMI, but many will because of the national risk and not of fear that the borrower may refinance elsewhere. It might take an appraisal to verify the house's current value, but the \$200 to \$1,000 PMI will still be paid in the first months if the PMI is canceled. One type of coverage, lender-paid mortgage insurance (LPMI), won't be dropped because the need to build into a higher interest rate. The interest gain is larger but with all its drawbacks, however, but even when there is equity available, the only way to get rid of the coverage and the need to be refinanced is the entire loan, though discharging with the current balance might also get results.

Even if you're not a borrower, you can pay for it, since, after all, the payee must take to offset the extra amount and check the net mortgage bill to be sure it was properly covered. Lenders can also stop using a mortgage when the lender sells the loan to another company. Because earning debt is an asset that can be sold and used, and a mortgage note can change hands more than once before it's paid off or refinanced. But again, borrower beware. Examine monthly and annual statements to make sure the terms remain the same and aren't tampered or altered by a new owner. If you suspect problems with your

M

y favorite *This Old*

House projects are those that take their identity from their surroundings. The adobe house we rebuilt in Santa Fe

seven years ago always had Santa Fe, not Florence or San Antonio. And it's hard to imagine a more appropriate place than a New England for the timber-frame barn that Todd Benson put up for us.

This winter, we fled the streets of Boston for the desert landscape of Tucson, a town with a cross of houses that were especially suited to their physical and historical environments. Tucson looks and feels like an old Western village right out of the movies. Stark dry mountains dotted with saguaro cactus rise up on all sides. You could point your finger toward the setting sun and ride right into a John Wayne scene, many of which were actually filmed at the old Tucson studios. But the town's deeper roots are Native American and Hispanic.

Our project home is a blend of all these traditions. The living and dining rooms are reminiscent of an old Western lodge. The house is organized around a central courtyard like a Spanish hacienda, and its style is called Pueblo Bonito because its simple, earth-colored exterior walls are reminiscent of the original Pueblo Indian dwellings. The architect's plan was ambitious, and a project like this could easily slip out of control, getting bigger, more complicated and more expensive than intended. If that happened, the biggest danger would have been to do with economic stress with design. The informal charm and sense of place in this house could be easily destroyed. Jim and Colleen Mays, the homeowners who have lived here for 17 years, are not about to let that occur. Jim, an architectural designer with many Tucson homes to his credit, has determined clear boundaries in this remodeling. For example, he has refused to move into the original bathroom. He likes their funky-colored tiles. And he has been equally adamant about keeping the original steel windows, even though a window manufacturer offered to replace them free of charge. Jim says his biggest challenge will be to keep the rest of the new addition small enough that it won't overpower the original structure.

The Mayses are hardly worse than what makes their home special: is a sense of perspective rooted in its history and location. "We have an old Tucson house," Colleen says. "We want to keep it that way."

—Steve Thomas



A curved concrete bench, slatted metal, will square up the way old adobe, iron, entertainment center fit the Mayses.



Project contractor Jerry McQuinn (left) and Mays is a Hispanic transplant who loves Tucson's desert climate.



Long, arched concrete columns will become a part of the new structure, but a pit dug years ago for a hot tub will be filled in.

PHOTOGRAPHS BY DAN BORRIS





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When you buy a car in Japan, the salesperson takes time to get to know you. Pleasantries are exchanged. Questions are answered. And never, ever is the buyer put in a position of disrespect. So you can imagine, in our decision to send Saturns to Japan, we had to focus on many cultural nuances. Like moving the steering wheel to the right-hand side of the car. And changing the frequencies on the radio. Even shortening the turning radius for those narrower streets. As for the way we sell Saturns, however, we found that we didn't have to change much at all. Respect, it seems, translates no problem.



Understandably, everyone in Spring Hill is pretty excited with the idea of Saturn going to Japan. On its own body core in Gmpt Assembly just as it's going to be a great feeling knowing those shops are going back to Japan loaded, instead of empty. I mean

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Tucson showcases the unfettered backyard.



A small living room, but big enough.



There's a lot of work to do.

RAISING

ARIZONA

The crew from *This Old House* takes a Pueblo Revival home in Tucson to a new level of habitability.

MEET MARMING, ARCHITECTURAL DESIGNER JIM MARMING IS UP AT 3:30 AND OUT IN HIS BACKYARD STUDIO, SKETCHING coffee and stretching plans for other people's houses. As the sun comes up, he can see become mountains, the spiky gray-green plants of his own one-acre oasis all about and an occasional roadrunner or coyote passing by in the sharp, clear light. Inevitably, the Southwest finds its way into his designs. Marming (rhymes with eggs) loves the relaxed, somewhat sleepy atmosphere of Tucson. "It's a big, small town," he says. One of the oldest continuously inhabited settlements in the United States, Tucson, now a city of 600,000, lies about 100 miles south of Mexico 60 miles away. The city spreads through a valley surrounded by five mountain ranges, with long forests of

BY JACK MCCLINTOCK PHOTOGRAPHS BY DAN BORRIS



Jim Marming, who runs a Tucson design studio, is the architect.



In the old "Arizona room," the fireplace is the big.



The main entrance overlooks the heart of the house.

100

recreated on back, with a fountain set in the center. But children came, there was work and sewing, and he never finished the job. The courtyard's 12 ornate columns still stand, giving the pool a nod, enclosed look. Friends like the show Meigs's "housewife."

For years, whenever they discussed the house, Jim and Colleen would find themselves immobilized by the various pain and care, and finally Colleen would say at frustration, "Well, at least let's do the kitchen." She finished the old kitchen area. Five and a half (the result of a faulty floor beam and a discolored wall-



After knocking out the base on the bathroom wall with Steve Thomas, remodeler Terry Klemmover a post-crawlup squelching dripping with water, below.

New, with the help of the Old House team, the Meigs' plans for refurbishing the house are finally being realized.

Steve Thomas and Norm Alvord drove into Colleen's kitchen—"a country neighborhood in the center of the city," as Jim Meigs calls it—one morning in early December for an inspection. The sub-cul-de-sac house is a series of rounded cul-de-sacs with a flat roof and thick, tapered parapet walls. Built in 1930, it is surrounded by mature magnolias, palm trees, prickly pear, cacti and cypress plants. There are three bedrooms and three baths, with a separate garage, studio and green garden on back, all successfully enclosed in a brick wall. Jim calls the style Sonoma Pueblo Revival, and it resembles the familiar Santa Fe pueblo, although it lacks the pre-trading roof beams, or vigas. There are also Spanish Colonial lanterns (arches, tiles, etc., the fountain).

Like the houses in most cultural crossroads, it's an architectural mix. And it is apt for a desert location where night air coolers can be gently hot. The thick walls of first-

Pacifying the Killer Bees

Steve Thomas is at the bathroom wall, a bee nest on his head and a nerve on his hand. There's buzzing in his ears and smoke in his eyes because the bee guy, Terry Klemm, is working the bees out of Steve's legs. He gets his body and the nerve inside.

The first bee swarm of the Meigs' house five years ago. They get to under the eaves and just to be safe, they get to under the eaves. They were on aggressive bees along Colleen's back porch. They were on aggressive bees along Colleen's back porch. They were on aggressive bees along Colleen's back porch.

European settlers introduced bees to the New World during the 1600s. Now there are 3,000 species in North America, and a third of our food crops depend on them for pollination. Bees settle in colonies, make hives for food, reproduce until the colony is overcrowded and then swarm. The queen moves off with 8,000 or 10,000 bees making a new colony. The queen European bees do this in March, April or May, but Africanized bees

sidekick bees can delay swarming until as late as a month. Inside the house are wood floors, covered ceilings and white plastered walls against which heavy, dark wood furniture commands dramatically.

"The house is basically in good shape," Steve said when a well-though "But it's at the point where a really nice what we're going to do."

That judgment was echoed by a professional inspector, Allen Baker, in a 40-page report. A licensed electrician coming on the house—what project contractor John McCulloch called "the yard work of the Southwest"—was poking all in places. The porch's joists beams were rotted halfway through. The floor in Jim's studio was warping. Electrical wires ran casually up the downspout and across the roof. Vex-Grip rodded in for valve handles in two beds rooms. Not entered a pipe roof outside the kitchen door. There were broken light fixtures, cracked tiles, loose firebricks in a fireplace and pebbled concrete damage. What's more, a hive of bees had nested in the roof of the master bath, and honey had dripped down and stained the walls yellow.

Unfazed, Meigs called the bee-removal man. He knew many reports on the house was long overdue, and he had deliberately warned and the work could all be done in one day. But, he acknowledged, "It's gone from a nuisance to a menace."

There are three main projects: creating an indoor-outdoor kitchen, building a new master suite and finishing the back porch courtyard. With each, Meigs wanted to maximize the house's pueblo feeling, as he had begun doing that first year by building the porch. "We're going to make what's best," he said, conceding a single purpose. Elizabeth had always wanted a bay window in her room, and her father had decided that, although it didn't exactly fit the architectural style of the house, she would get one now—"a Pueblo Revival one," he said with a smile.

The first priority was to do something about the bees in the bathroom roof. So Terry Klemm, the bee exterminator, got to work, with Steve Thomas's nervous help (see story, page 64).

As soon as the bees were gone, McCulloch and his crew started by pouring all the old master bath to make room for the new master suite. (Jim had always thought the bath was a 1950s add-on, but workers found a 1934 Times newspaper under the tub.) The old master bedroom was to become a library, a quiet room for Colleen and Jim, and a hallway gallery for family photos would lead to the new suite.

Designing the addition was a challenge for Meigs. An admirer of Frank Lloyd Wright, he often stated that "proportion is to architecture what loca-

Colleen and Jim Meigs take a coffee break with Norm and Steve on the porch, which they added to the house 17 years ago.



Here's to You, Mrs. Blimpington

There's a pit in the Meigs' backyard where they once intended to install a hot tub. That's of the hot tub generation, but they never got around to installing one. In the driveway, side by side, are two of the recent. One is a vibrant, a Florida-built Caprice RV, resting on the trailer and ready to be towed off to Mexico or the divide mile north. And Jim Meigs want the family like to see her, and he says, "Holding, holding, holding."

Also in the drive, which inside the house's general hall, is an impressive playhouse—large and built by the Meigs, gray-colored and handsome like the house. Colleen and Meigs recall from her childhood experience on Newmarket. The playhouse belongs to daughter Elizabeth who, one day on Jim was designing it as a surprise for her, and she was in the studio and asked, "What's that house for, Daddy?" Meigs thought fast and shouted, "It's for Mrs. Blimpington."

"Oh, Mrs. Blimpington sure is lucky!" Elizabeth later, Elizabeth had said that the dining room window and now the playhouse—Mrs. Blimpington, the playhouse, symbolized their making sense of family life in the hot tub, they haven't given it much thought for years. "Cream and looking just isn't in real satisfactory anyone," she says.



Pastorize the porch, Mrs. Blimpington's pit.

Hola, Linda Ronstadt

[illegible]

Gold's name comes from a story about the desert landscape, its streams purving to follow the most conspicuous natural features. Arroyo Chico, an empty stream bed that is dry except in the heaviest of rains, is said to be the only one of the branching that comes with seasonal downpours. Today, the arroyo is dead with mesquite, acacia and alfalfa—100 domesticated species of plants, visited by 191 species of birds as well as dozens of shrubs, yuccas and birdhouses. Instead of cactuses in arroyo floodplains under the shade, Chino carries *Salmon alba*. The stream simply sits like the golden and cold water of the desert. The arroyo is a desert. The golden stream is a desert. The golden stream is a desert. The golden stream is a desert.

tion it to real estate." The problem was how to graft 1990s living into a 1930s space. Jim wanted a bedroom that was appropriate to the scale of the house, which had built when rooms were smaller. Colleen envisioned a room of more generous size. It was partly to help find a compromise that the couple hired an architect, Alexandra Hayes (see story, page 40). From her own professional experience, Jim knew his wife was useful to call in to homeowners to have an unemotional help. And he knew Hayes was terrific, as well as a gifted designer. With her help, the Morgans found a solution, the best of many.

The kitchen presented another challenge. It was too small, but there was, once again, the problem of proportion. Furbie himself didn't have his country kitchen with skylight and food-preparation island. How to enlarge the kitchen, add a 1990s outdoor-living component and accommodate Collier's idea of how it should all look? The challenge, Jim said, was to create "a radical document that makes a helluva case."

At the south end, a non-load-bearing wall separated the kitchen from a sitting room. Removing the wall would almost double the kitchen space. There would be room for a breakfast bar, Viking range, dishwasher and refrigerator and plenty of cabinets. Instead of conventional upper and lower cabinets, the couple asked craftsman James Vonnac to build only lower cabinets to most of the kitchen, with an additional full cabinet wall. They asked him to build them all of meganite, a slow-growing, hard, heavy and beautiful local material that was becoming more and more of a medium to pathway for bachelors firewood. When finished, Vonnac's work would resemble hissonce against the white walls—the same look Calvert loved at their living room. And Megan had persuaded painter Gilbert Chavez to come in on occasion to maintain to plaster all the interior walls, including those in the kitchen, to match the rest of the house.

But what about the kitchen's condiment component? Tacosnans spend a lot of time outside, and the Mangos wanted the perfect place to eat them. "It has to feel like part of the original house," Jen said, "but allow the inside to be the country, which is a more recent creation."

Just outside the kitchen was a little patio with a low wall, a gaze and a pergola roof. It was adjacent to both kitchen and courtyard and, because it was original, its proportions were perfect. It would be the outdoor portion of the kitchen, with poured-in-place concrete countertops and a new built-in fireplace on the corner housing French doors



Proposed by name, as much in the example, if
contract of delivery, with (the right
and press, is the question of investigation, and
some other duties. The idea makes sense.



It will be the courtyard is replaced to rubble to make room for the new master suite.

between the patio and the indoor kitchen would create the perfect indoor-outdoor space for cooking, dining and entertaining.

Another room illustrated how the use of space changes as social habits and technology evolve. Many Southwestern houses have what's known as an "Arizonan corner," a shaded, partly-walled porch, mostly open to the outdoors and often set in the eap of a whitewashed house. The Maingau Arizonan corner had been enclosed, possibly in the 1960s, with aluminum windows and grating that looked, Mesa said, like "molehiding." When the couple moved in, they tore out the windows and siding, raised and raised the floor, added big terraced glass windows, built in planters, bookcases and a bench fireplace and stuccoed the walls. With TV and VCR added, it became a media room where the family spent many a desert evening watching by the fire.

But today, in Meng's view the fireplace seems too big and the tile floor and bookcases more Spanish than Pueblo, so the plan is to pull out the tile and make a new floor of a traditional Aztec stone material, called poured concrete. The walls

adjacent to the fireplace will be furred out and plastered, then enclosing the fireplace's arch, with moldings on the plaster replacing the heavy, dark hoodmold. Then, Mays says, he'll be correcting a previous owner's mistakes as well as a few of his own.

Early plans called for a new garage, which was vetoed on the grounds of cost. But they would move the laundry inside from the garage, update the mechanics (by installing an energy saving, gas-fired "chiller" with only three moving parts) which would cool the house using a water ammonia matrix crash up on maintenance (pneumatics and electric), and give the place a total rebirth. Then left for doing off the courtyard, which would be fairly strong (horizontal poured concrete underfoot, glass-enclosed beams overhead) (the right-to-right Jim had used on the front porch 12 years before were hard to find now) and a lot of green (art around the fountain for a touch, in this case, use of precise hatching. "The house will have a cool interior, a cultivated courtyard as a real separate unit from the city, seven convenient minutes," Steve Thomas observed. "It will be a true desert house."

adobe, the magic mud

You can huff and you can puff, but you can't blow this house down

BY BRAD LEMLEY PHOTOGRAPHS BY MICHAEL STEWELLYN

The specialists at Adobe Construction Co. are creating a new look while working on a historic building in San Francisco. The building, located near the Golden Gate Bridge, is a prime example of how a new generation of builders who work with adobe is successfully building the ancient building material into the modern world.

THE WALL, MASONRY AND INTERIOR DESIGNER the online Arizona sky, could be part of a Zuni glass dwelling, circa 1500. Some early dwellings, dual-colored adobe bricks had mortar applied with bits of wheat straw gave it an air of versatility, dignified strength. There's just one small snag: we want mud to look like a foot above the ground, packed with cold blue water. "That's a high-speed computer hit," says general contractor Michael Kerby. "The client is a writer, and he needs a sense of the art connection to the house."

This wall is part of the future. The house of David and Billie Hardy, and a legend the couple's dream. While David, an anthropologist and author of medical journal articles, needs high technology, Billie, an artist, preservationist, says she wants the house "to look like it's been here for a hundred years." She's done that by selecting an old architectural style, Sonoran, featuring a fortress-like exterior, an interior courtyard and a wide central hallway called a passageway. Adobe—heavy, gritty and red—is a central to her vision. "Look at these blocks, isn't they progress?" The appeal is obvious, surprising. It's not good old dirt.

The Hardys' house, in Tucson's Barrio Historic district, is a prime example of how a new generation of builders who work with adobe is successfully building the ancient building material into the modern world. The appeal is obvious, surprising. It's not good old dirt.

A big factor in the resurgence of adobe has been the modern quest for energy efficiency. Ironically, these mud bricks are terrible insulators—a four-inch block costs just \$1.50, about the same as one inch of cellulose insulation. But "there's more to energy efficiency than high R values," Kerby says. While an R-34 polystyrene-insulated wall with one window compares to

BRICK BY BRICK



Masonry contractor Eric Henson lays the first course of adobe bricks on a concrete block stem wall. A broken high. The adobe is elevated to prevent water seepage.



Adobe bricks vary in size and require lots of mortar, which is applied with short-handled shovels, not trowels.



A mason sets the bricks, above, then rapping them back and forth to squeeze out gaps in the mortar below.



To ensure the structure will be self-healing, workers place two lengths of 4-inch-wide, 4-inch-thick angle iron along the wooden form.



Small adobe masonry bricks are laid on either side of the angle iron. This creates a form for pouring and compressing the concrete beam.



Masons use one of two pieces of 10-inch-diameter reinforcing steel for beams. No. 10 (left) is the heavier brick. The other side of each piece of concrete brick, which is laid next to a piece of brick trowel a paper. The paper acts as a bond breaker to prevent the expansion and contraction of the wooden beam from disturbing the concrete beam.



Rebar to all concrete are poured into the cavity to form a steel-reinforced, 8-by-8-inch concrete beam. A smaller reinforcement beam (shown in the upper left) is poured at the top of every wall in the house.



volutions, adobe masonry them. Because it so dries, adobe heats up and cools down much more slowly than the surrounding air, so the bricks may fairly close to the average outdoor temperature during a 24-hour cycle.

"While outside you're got a swing from 70 to 110 degrees over 24 hours, inside you're going from 80 to 90. That's a big break in cooling bills," Kemp says. He believes a desert house that makes intelligent use of adobe's heat-modulating traits could keep year-round indoor temperatures between 75 and 82 degrees with an additional heating or cooling. Indeed, he's designing such a house for himself.

Masons made from stacks of sun-dried bricks of mud and straw have dotted desert landscapes worldwide for thousands of years. Besides Silt-Silt details how the Egyptians, ancient in Egypt, were flaged for failing to meet their production quota of straw-reinforced bricks (Yishaki responded by setting frog, mongoose, and lizard plaques on Pharaoh).

Traditionally, adobe bricks were made in site—simple, if laborious, work. The method: Dig a shallow depression in the shape of the house-to-be, fill it with water and straw, stir. Shovel the mud into wooden brick-forms. Repeat a few hundred back-breaking times and you stand up with an adobe house complex with cul-de-sac. The today, even modern adobe has regard such labor as too hermetically accurate and are content to purchase bricks and have laborers to place them.

A major drawback of adobe used to be a tendency to revert to rammed mud when wet. So rapidly impregnated, water-shedding adobe bricks have been popular since the mid-1940s. More accurately, concrete-reinforced versions have been catching on, and that's what the Hardy's chose. Unlike reinforced bricks, which have a dark hue, "this looks like the original adobe you find in the area," Balle Hardy says.

A partner might argue that such fortified bricks aren't really adobe—but typically, these additions comprise 10 to 15 percent of the brick's volume—that's about the percentage of cement in concrete blocks. Although adding cement to an adobe doubles its compressive strength, the reinforced bricks aren't as early crumbly compressed work load ones. The masons on this job cut mud bricks by simply whisking them with the edge of a trowel.

And although they won't melt, they will absorb water. To prevent flaking during Tucson's occasional subfreezing winters, the exterior walls must be protected by large overhangs, or coated every few years with a breathable water repellent such as modified silicate.

Because the raw material—mostly desert earth—is literally dirt cheap, the bricks cost somewhat less than the lumber, drywall, insulation and siding of typical frame construction. The building process itself is often cheaper as well, particularly if, like the Hardy's, you choose not to plaster over the bricks. "When the workmen lay the wall, they are doing the structure, interior and exterior finish in one operation. You don't have different crews coming back day after day," Viter says. The Hardy house will come in at \$99 per square foot, up to 30 percent less than equivalent custom-designed frame houses.

Much of the cost of building with adobe is incurred in hauling the requisite tonnage of bricks to the building site and treating them into place. The walls of a 2,000-square-foot mud-brick house weigh about 10 tons, those of an equivalent adobe dry-laid wall weigh about 334 tons. This weight, Viter says, means adobe structures are best confined to one story. But it's his view that integrates adobe architecture. It even requires large, leafless skinned construction props to disengage without prodding. "I have an emotional attachment to solid walls, as opposed to walls that you hang from and it sounds like you're living a dream," says Viter. Balle Hardy, head of the masonry crew.

In modern adobe work, the walls are reinforced with steel. Traditionally, the foundations of adobe houses were simple trenches filled with rubble, and flees (the structural support over doors and windows) were plain wooden beams. But to meet code, as the Hardy's new house means poured concrete exterior foundations and found their interior walls with an intricate network of massive reinforcement. The weathered, mortar-pocked bricks joggled down occasionally and demolished Tucson houses are partly decorative. The real support is supplied by a network of four-inch-wide adobe bricks. "We've been using the military wall made to last: the house for a bomb shelter is one of several stacks," says Balle.

Still, building an adobe house in the '90s requires adapting to its concrete work rhythms.

Variability of brick sizes requires vast quantities of mortar to be mixed on site, as adobe walls are about 20 percent mortar. The ubiquitous steel among the dozen Spanish-speaking workers in this area "We make it" ("Make it"?) The act of housing a 32-pound adobe brick and using it in a place isn't much quicker than a wall in the tops of the concrete houses. And there is the endless repositioning of scaffolds so that the masons can place the bricks in a corner—yes, at least, not crapping—being it.

"At the end of the day, these masons get heavy," says Bob Weyl, a mason for 30 years, finishing a gold-toothed grin. "I'm getting too old for this. I've been doing this for 30 years." But, he adds, surveying a day's work, "It is beautiful stuff."



BUILDING BLOCKS

Native Americans brought adobe bricks long ago and in this modern's tendency to start in occasional new kind of adobe plaster. But modern-day masons aren't so expected to lay bricks in a modern concrete-reinforced manner, as a variety of adobe and manufactured processes have been devised to make adobe more durable. The five traditional types of adobe in use today are, from top to bottom: 1. **Hand-pressed, mud-cast adobe bricks.** These bricks are made by hand in a wooden mold. 2. **Hand-pressed, mud-cast adobe bricks.** These bricks are made by hand in a wooden mold. 3. **Hand-pressed, mud-cast adobe bricks.** These bricks are made by hand in a wooden mold. 4. **Hand-pressed, mud-cast adobe bricks.** These bricks are made by hand in a wooden mold. 5. **Hand-pressed, mud-cast adobe bricks.** These bricks are made by hand in a wooden mold. 6. **Hand-pressed, mud-cast adobe bricks.** These bricks are made by hand in a wooden mold.

Tucson Adobe West is a medieval, three-process operation among the oases and quickly goes about 14 miles northward of Tucson. But it goes south with imaginative dispatch, making out 1,000 cement-stabilized adobe bricks a day.

The process begins with a front-end loader, which scoops the top earth down to about five feet—the deeper soil is "too gravelly," says company president John Acton. The soil is dumped onto a vibrating screen that removes any stones larger than three-eighths of an inch. Next, the screened soil moves to a conveyor belt under a feeder nozzle, which spits out a measured quantity of portland cement. The cement-soil mixture then drops into a mixer mounted on the front of a forklift, and the operator adds water and straw. The recipe for adobe, by volume, is 65 percent screened soil, 7 percent wheat straw and 8 percent cement, combined with a rough water flow of 5 to 10 gallons per 12 cubic feet of mix to make it mold but pourable. Each ingredient has a purpose. The soil provides bulk. The cement gives tension resistance. And the straw, purchased from a local

store and chopped into four-inch segments, does several things: prolongs the drying time (the straw slowly soaks water, the drier the F is), imparts some tensile strength, breaks the F into a brittle and breaks up soil lumps in the molding process.

The mixed adobe is then driven to a metal form that has been dusted with powder to fill for the same reason you'd flour a cake pan—to keep the form from sticking. All bricks are cast, one step at a time, right in forklift pallets. "The key to keeping costs down is to avoid moving the adobe by hand," Acton says. These bricks sell for \$9 cents each.

The mix is dumped and screeded to create 30 bricks at a time. Each standard brick mold measures 8 by 11 by 15 inches. In construction, those dimensions will fit out with mortar to approximately 4 by 10 by 16 inches, which is compatible with a wide variety of adobe and clay openings. Just a few minutes after they do the pouring, workers lift off the forms and the bricks dry; they can be laid up in a wall within a week.

the birth of a mud brick



Adobe bricks are made directly on pallets to avoid the labor of moving them by hand. Keep note: A heavily ridged belly of soil, cement, straw and water is dumped into a metal form.



After screeding—drawing a metal bar across the top of the form to remove excess mix—workers gently lift off the form.



Bricks cure in the dry desert air for at least a week. Then these pallets, each bearing 2,500 pounds, will be forklifted onto trucks and taken to construction sites.



OUR FATHER'S HOUSE

At Mount Vernon, one encounters the real George Washington—soldier, statesman and handyman.



Mount Vernon from the east lawn. The high columned porch, often cited as one of George Washington's most impressive architectural ideas, is as beguiling a gathering place in our time as it was in his. A plaster bust of George Washington, dating from 1784, is on display in his study.

MOUNT VERNON WAS more than George Washington's home; it was his project. From the time the Virginia property came into his hands in 1754, when he was a bold and desperately ambitious young major in the British army, until his death two weeks shy of the millennium in 1799, by which time he was the embodiment of American grandeur and rectitude, he never stopped tinkering with the place. For much of his life, Washington was away from home on thunderously urgent business, and so he directed most of the work on Mount Vernon from a certain Olympian remove. But his correspondence is so filled with appraising references to wallpaper, nails, paint, hinges, locks, putty and glass that the man who emerges from it seems as much a frustrated handyman as the presiding figure of his age.

Even when things were at their bleakest, when his new country was falling apart before his eyes, Washington never lost interest in his fixer-upper on the Potomac. In September 1776, in one of the first crucial engagements of the Revolutionary War, the Colonial army suffered a humiliating rout on Manhattan Island, fleeing in panic from the invading British and Hessian forces as Washington rode among his troops on horseback trying futilely to beat them back into action with his riding whip.

"If I were to wish the bitterest curse to an enemy on this side of the grave," he wrote to Lund Washington, the cousin who managed Mount Vernon in his absence, "I should put him in my stead with my feelings." But in the same letter, penned in a dark hour when his cause seemed hopeless and he felt his reputation sagging into disgrace, Washington was still issuing instructions for work on his dream house. "The chimney in the new room should be exactly in the middle of it," he instructed Lund, with

a splashy change of scene and scope, "doors and everything else to be exactly unobtrusive and uniform—in short I would have the whole executed in a masterly manner."

The homegrown Palladian mansion that Washington controversially remodelled on his 8,000-acre estate sits on a high bluff above the Potomac. Although it is now just 11 miles downstream from D.C.'s National Airport, Washington's "White House" still manages to impart a formidable sense of permanence and serenity. And if you're fortunate enough to have the place to yourself, as I did one recent evening thanks to the hospitality of the Mount Vernon staff, Washington seems no more remote a presence than the fireflies on the winging lawn or the swaying branches of the aged oaks that tower above the southern wing of the mansion.

I was sitting that night on the piazza, the commodious high-ceilinged ground-level porch that faces the river and runs from one end of the house to the other. It is a legendarily colorful and versatile space that George and Martha Washington often used as an open-air dining room. An extensive veranda like this—which has since become a mainstay of North American domestic architecture—might seem to us an obvious way of taking advantage of Mount Vernon's splendid location, but it is the case the piazza was built nothing of the sort had yet been seen in England or the New World. The ingeniously practical George Washington simply thought it up on his own.

From the piazza, I looked out over the lawn in the fading light. A gentle grassy slope led down to a steep perspective planted with trees, my eye caught over the leafy canopies of this "hanging wood," past the deer park below and an oak to the commercial Potomac. The only hint of the present era was the steady electric light of a single house and the overhanging pinnacles of an engine.

When George Washington's father built his compact and unassuming house here at (it is believed) 1783, it had faced unobscuredly east, toward the river and England. In the first of his two major remodeling projects, Washington moved the elevation from one end and a half to two and a half acres and merely

The main entrance to Mount Vernon, where Washington greeted visiting guests, sits on the west side of the mansion. It opens out as a greeny expanse of lawn to the breeding ground.





In a letter, written May 24, 1770, George Washington calculated the number of bricks needed for each section of a new bath.

His House, Our House

New York architect Robert A.M. Stern, who has designed dream houses a big or bigger than Mount Vernon, once

labeled the white mansion on the Potomac River "the most widely studied building in America." Indeed, the vast majority of the nation's single-family houses owe a debt to George Washington's presidential-style example.

A wide range of design elements derived from Mount Vernon are now ubiquitous. Classicist architect Allan Greenberg points to the quasi-neoclassical American circular porch that skirts the front door and encompasses the "wing-dormer" junction of the house. Washington built Mount Vernon Ladies' Association curator Christine Meadows says its optimistic spirit throughout majestic in quiet capotes added to porches.

On these same roofs you might find rounded wood shingles, which, like those at Mount Vernon, are "painted red to look like flat clay tiles," says John G. White, an architectural historian. He frequently uses copies of the mansion's neoclassical interiors and of the decorative plaster ceiling in the small dining room. The sporty circular features Americans have borrowed from Washington's residence, he says, is the full-scale porch.

Although more than 200 years old, Mount Vernon continues to be as lively as ever. Two decades ago, critics concluded that the dull pastel colorings selected from the Federal era were more than a little flat, as one believed "that Washington lived with these bright colors," says Meadows. But both chemical and spectrographic analyses agreed with 18th-century pigment orders in the association's archives, so in 1979 the mansion's two dining rooms were reintroduced in different shades of vermillion green. Since then, hundreds of visitors have requested the paint formula.

It is too much to argue that these rooms have come back as emblems from Washington's supposed ideals, but they do serve as reminders that the great, sober leader who publicly distanced pomp and made a show of turning away from also spent a good deal of often designing his own audience and obviously placing his worldly advancement.

Still, it is the public Washington—even misnamed, even-handed, magnanimous—who dominates Mount Vernon, just as he dominates history. During the eight years he was away fighting the revolution, he scarcely ever left the camp, even as home only for a total of 10 days, but with an almost godlike omniscience he oversaw the placing of every board and the hammering of every nail. "What are you going about now?" he wrote to Land in 1783. "Have you any prospect of getting into and out? Are you going to repair the Pavement of the Piazza? Is anything doing, or like to be done with respect to the Wall at the edge of the Hill in front of the House? Have you made good the decayed Terrace at the end of the House, or the Hedges, &c. Have you made any attempt to reclaim more Land for meadows? &c. &c."

It was an endless, expensive, constantly expanding project, made possible only by the hundreds of slaves that Washington



The cupola, built in 1775, served as a natural air-conditioning system by drawing hot air from the interior of the house. In 1787 Mount Vernon selected a weather-resistant, 6 days of peace made of laminated paper. The cupola looked down on the kitchen (above), which was separated from the main house by a fire-prevention passage.



renewed the house, glazing the formal entrance on the west and thus obliterating the severe Puritan side from the constant bursts of arriving and departing traffic.

Washington made dozens of such minor alterations, eventually turning his father's humble frontier house into an imposing but never ostentatious mansion with multiple dining rooms and parlors, eight bookshelves, a study and a cluster of outbuildings, known as dependencies, elegantly bound on the main house by colonnaded passageways.

He never claimed to be an architect—he once wrote that, although he knew "rules of Architecture" existed, he did not know what they were—but the structure and cultured spaces of Mount Vernon are indisputable expressions of his mind and will. A few of his building sketches survive, and they are plain and clear and sometimes lightly inventive. "Washington was his own architect and builder," wrote his wife's grandson, George Washington Parker Curtis, "laying off everything himself. The buildings, gardens and grounds all owe to ornament and usefulness under his fostering hand."

George Washington spent his whole while constructing Mount Vernon, and to a degree it is a culmination of his own complex and ever-evolving personality. It is, for example, a monument to privacy and containment. On the outside, there is no frippery, no ostentation, no architectural flourish that does not serve a visible need or afford a practical pleasure. Inside, however, in the dining rooms and parlors, one finds a hint of the flamboyant, obsequious, temperamental and culturally vain man still due it was Washington's life's work to tame. The walls in these rooms are painted with intricate, classical colors—glowering Prussian blue and several eye-popping shades of verdigris green—that are as vibrant as the outer walls are

Modern-day visitors to Mount Vernon can sit on the east lawn, looking out over Washington's "hanging woods" toward the Potomac River.



and his wife owned. Most of these slaves were field hands, but some were skilled carpenters and housewives. Washington's conscience was troubled, though not removed, by slavery. He wished to see a design: "by slow, sure and unperceivable degrees," but in the meantime he needed all their free labor—all those skilled hands wielding axes and hammers and planes and draw his nails—to shape his umbels, to cut his cypress shingles, to mix his plaster and fix his bricks and to bend and mosaic the pine planks that covered the mansion, giving the appearance of cut stone.

It was not just the mansion that was constantly being repaired and expanded but the whole plantation, with its stables, dinner quarters, vestibules, kitchens, coach houses and laundry yards. There was even an extensive "dang repository" for crops. One of the plantation's most intriguing structures was a two-story feeding barn. The 16-sided structure of this rotatory barn represented a circle. Inside, a horse could walk around and around the circumference of the second story, flaring wheat with its knees. As the grain was separated from the chaff, it drifted down to the collecting floor below through gaps in the planking. The barn fell into ruin and disappeared sometime near the end of the 19th century. But when I visited Mount Vernon, a massive and expensive replication project was under way, replacing the pasturing of 300 logs, the molding of 40,000 boards and the splitting by hand of 15,000 cypress shingles.

I spent an hour or so inspecting the framework of the unfinished barn and watching workers level pot-sown plants with drawing levels. Then I went on a walking tour of the grounds, poking my head in all the nooks and crannies and circling through the two remarkable gardens—one for growing fruits and vegetables, one for ornamental flowers—that flank the bowling-green extending from the west face of the mansion. It was an extraordinary contrast, not just the plants but the beautiful curved back with enclosing trees. Even the scattered graves, with their white domes and spacious summer-house feel, were part of Washington's handling vision: the studied harmony of structure and open space that signaled over the entire Mount Vernon grounds.

"I am now I believe fixed at this seat," Washington wrote after his marriage to Martha in 1773, "with an agreeable Consort for Life and hope to find some happiness in retirement that I ever experienced under a wide and bounding World."

Washington was still in his twenties when he announced his retirement, but neither the bustling world nor his own bustling nature could tolerate his living in quiet and consequential life in a country square. His years of peace at Mount Vernon were chronically interrupted by bouts of war and political turmoil and by the cruel trading his reputation demanded. In the end, that reputation almost totally obliterated him. "Washington," Abraham Lincoln once declared, "is the English name on earth."

During Washington's better years, when he finally managed to retreat from public life, hundreds of people stopped in at Mount

Vernon annually to enjoy the range of his hospitality. He was a cultured yet somewhat elusive host, posing his guests for meals but frequently slipping away to his bedroom and private study, or to make his rounds of the plantation.

"I am not only retired from all public employments," he wrote Lafayette, "but I am retiring within myself. I will avoid greatly every thing the stream of life, until I sleep with my Fathers."

George Washington sleeps with his fathers today in a leaded-glass bed in his specifications on a wooded slope between the mansion and the river. In a sense, it was Mount Vernon that killed him. With a throat already raw, he had inhaled a year-long cold and deadly December day to finish a round, eager to reach some trust for removal to the shore of the river from the piazza would be improved.

He went to bed in good spirits that night but woke in the early hours of the morning with a violent inflammation of the throat that slowly sequestered all his breath.

"I had I am going," he said.

He was 67. The bedchamber he shared with Martha, and in which he died, is one of the rooms on the mansion now. Visitors are not allowed in the room, but they can look through the door just long enough to take in the spartan details.

And it is a shame to give the most private in his a room. When I went on the tour I lingered there as long as I politely could, admiring the rustic pine floor, the plain white wallpaper that Martha preferred to George's reds, the spacious linen closet. When I turned my eyes to the bed on which Washington had died, I felt an unexpected spasm of emotion, as if after spending a day at Mount Vernon I had suddenly come to know the figure who had once been there slowly suffocating.

"It is hard, but I am not alone," says Washington gazed toward the end of his long last day. It was a grim and premature passage, though one would like to hope he took some comfort in the fact that he was dying in a room he himself had built, that he was passing into history within the shelter of his own creation.

George and Martha Washington's bedchamber. Here the last one Washington's powerful designs and the furnishings used in the bed that he had died.



Betty McMoran loved the way her house looked like a Connecticut house—until the basement started absorbing rainfall water.



Effort to avoid smothering the stonecrete or slipping into lines for water and natural gas, waterproofing expert Dean Morone maneuvers an excavator across the head of McMoran's house and digs a trench down to the loadings.

It is *not* that very hard, PENE MARKY of GREENWICH, CONNECTICUT, one think back to a time when her basement made her happy. Her husband, Terry, set up a workshop and an exercise room down there. Her two children all but disappeared into the playroom, which the previous owners—"nice people who owned it never looked," recalls Marky—had painted in white. But even after moving in 10 years ago, she noticed downstream basement water a spring rain and stepped onto a cold, soggy carpet.

It was just a little water at first, but with each storm the tide rose usually higher in the basement. The Markys even had an electric sump pump, which kept things relatively dry and late October, when a Nor'easter struck the coast. At six inches, the rain went bad, and the winds were powerful enough to topple a giant white oak on the family's front lawn. When the tree fell, it ripped apart power lines across the street, leaving the Markys—and their sump pump—without power for five days. Downstairs, water hit the oven floor mark. "Everything was flooding," Marky says. "All the kids' toys were wiped out. The pool table—first, of course—was shot. The exercise equipment, gone." Not to mention the damage to the water heater. In all, the damage came to \$15,000. "When the Markys' insurance agent told them none of it would be covered, because their basement, like most basements in this country, was not covered for floods. "I always wondered why people

In order to drain all the water that might leak inside the house, the exterior perimeter drains must be placed next to the footings, below the basement floor. To reach this level, workers just hammer a trench through a footings of ridge rock that couldn't be bridged with the excavator.



Water, Water,

Wet basement headaches can be cured, with a little common sense and a willingness to dig deep. BY CURTIS RIST PHOTOGRAPHS BY BERND AUERS

everywhere



Instead of using foundation tar, a sealer as thin as the exposed wall by quickly smearing on a layer of 60-mil-thick Sheetrock cement, similar to roofing materials.

Amazing homeowners, few things can match the aggravation caused by a wet basement. And there's no comfort in company. According to the Ameri-

can Society of Home Inspectors, 60 percent of all basements in the nation have foundation leaks, and the number doubles to 90 percent for houses built with cinderblocks. Water is a home's greatest enemy. Accumulating in the basement even in tiny amounts, it can warp floorboards, rot the life out of appliances and carpets and turn a finished room into moldy chaos. Just to bad is the case, in

The foundation sealing makes the walls stronger, not waterproof. For extra protection, the new owner's 22-inch-thick plastic rubberized sheet that drains water from foundations, houses outside.



time and money, of trying to find the leaks and fix them. Water seepage "a little corner of the house," says Tom Macaroni, president of U.S. Basement Waterproofing, a business he runs in Flushing, New York, with his sons Dean and Ben. "It shows up in one little spot, and before you know it, you've got a big problem."

Even crawl spaces and poured slab foundations are susceptible to water damage. If diagnosed improperly, they can trap moisture and leak. Hidden from view, the problem is easy to ignore until it's too late. John Annunzio, a licensed home inspector in Westchester County, near New York City, did a routine wet crawl space security only to discover that "you could sink the house with your hand and squeeze them like a sponge because they had become rot."

As frustrating as basement soil crawl space leaks are, many can be fixed with modest effort. "In a lot of cases, the problem occurs because the site isn't right," says The Old House master carpenter Niles Ahrens. This condition can be corrected, he says, "by helping the natural drainage away from the foundation." As a fix, The Old House contractor Tom Silo suggests putting a ball on the ground next to the foundation. If it rolls away from the house, the slope is fine. "If it rolls toward the foundation, you're in trouble," he says. To fix the problem, Tom suggests clearing away shrubbery and gently building up the soil to slope away from the foundation, with a grade of at least one inch per four feet (To protect against rot and insects, however, the soil should be kept at least eight inches away from wood siding.)

Downspouts can also be a source of trouble. Some end right at the foundation, where, during rainstorms, pools of runoff water can seep through cracks in the walls. Simply extending the water by extending it to the downspout a few feet away from the house can help. For bigger problems, the downspout can be connected to a pipe buried 18 inches deep that uses gravity to drain water farther away from the foundation.

But not every problem has such an easy fix. At certain times of the year, the strong water table can force itself into basements through a phenomenon known as hydrostatic pressure, which pushes one stop. "I've seen it



actually squaring up through basement floors and into the air," Tom says. In these cases, no amount of patching, repainting or drainage pipe will help. "You've got to find where the water's coming from and get it out of there."

During the same New Yorker that deluged Pecky Mackey's basement, her neighbor Betty McMahon found her own home about filling with water for the first time since the house was built in 1955. It was barely a deluge: A carpet-drying company sucked up just five gallons of water. But McMahon depends on more from a treasure in her basement apartment—a friend who was likely to lose if the flooding continued.

"When I saw that water, I knew it was only going to get worse," she says.

During an inspection, Tom Macaroni quickly diagnosed the problem. McMahon's house had been built into a rocky hillside, and runoff water drained directly against the front foundation wall. To complicate things, a puddle of water near the front door turned out to be a spring, which kept the ground saturated year-round. "The trouble is that this was her first leak," he says.

Both the flooding disaster and the downspout drains are tied to gravity into pipes buried in a trench dug off to the side of the house.

After a corrugated black drainage is laid in the trench, gravel is spread on top to keep the pipe from plugging up with dirt. On the inside, sheets of French drain insulation are glued into the rubberized sheet to prevent leakage.

When repaving is not the answer, Macaroni suggests building either an exterior or an interior perimeter drain to stop leakage. McMahon chose the exterior system, because she didn't want to rip up the carpet and floors in her finished basement. "I wanted the work outside," she says. First, work crews excavated around the base of the house down to the footing. They laid a drainage pipe in gravel to draw water away to a deep, self-dug trench dug to one side of the yard. As a precaution, the foundation walls were waterproofed not just with a 60-mil coating of tar, but with a 22-mil rubber and sheet and an inch of foam insulation as well. "It's a lot of material," Macaroni says, "but there's no other way to make sure it works." Finished in three days, the new drains and the waterproofing cost McMahon \$2,950, but the expense seemed worth it when the next storm

arrived. "It rained last night, and guess what—no water!" she says with delight. "I can draw about eight inches to check."

McMahon may now be free of water worries, but her friend Pecky Mackey still feels hard-luck. In the weeks since the New Yorker, she has had some good news. The insurance company finally declared her basement



After the trench is backfilled to the halfway point, a second drainage is installed in earth runoff from the downspouts.



damage "an act of God" and covered everything. But to prevent another flood, the Mackeys must build an exterior perimeter drain around their entire house. The estimated cost, which will also be covered by insurance, is \$21,000. Not surprisingly, McMahon kindly lends herself pressing for a basement-free life. "I want to do the Henry David Thoreau thing," she says. "Give me some woods, and give me a cabin. My basement can survive on the simplest of environments, as long as it's warm." And dry.

During a rainstorm at their new house in Brewster, New York, David Angley and his family found their downstairs rec room filling with water. "There was nothing we could do but stack up the furniture, roll up the carpets and start pumping it out," he says. An inspection revealed the problem: The house's exterior footing drains had been damaged during construction. They could be replaced, but a cheaper solution lay indoors: running a drainpipe along the basement wall. For \$4,000, a crew jackhammered a trench into the basement floor, top left, then dug it out so four-inch corrugated piping with sills on all sides would lie



below the concrete slab, middle. Interior systems require a gravity feed or a pump pump, which is installed in a shallow well, bottom left. Once the pipe is placed in the trench and covered with gravel, below, a plastic vapor barrier, bottom right, is laid on top and then patched with cement. "We've had lots of rain since," Angley says, "but it's been dry as a bone."



Tom Silva's Quick Fix

Excess water leaks come in many varieties, as homeowners know. But for the ones you can actually see—water literally dripping through a crack in the foundation wall—Tom Silva recommends a temporary fix. Patch the crack with hydraulic cement, a product that expands rather than shrinks as it hardens. The first step is to clean out the crack to a depth of about a quarter inch. "You have to have a place on each side for the cement to bond to," Tom says. Hydraulic cement comes in two types, those that set in five minutes and those that take 10 minutes. Give the faster-setting cement 15 to 20 minutes to set, then push the cement in with a small trowel. Once water starts to flow, the stopped water running in through a crack in a matter of minutes," he says. The key is in the temporary stopping. "If you don't do that, you'll be wasting your money."

Avoiding a Ripoff

When getting a basement is tricky, but finding a reputable contractor for a big job can be even trickier. To ferret out the fly-by-night guys, says Tom Silvano, check with local building inspectors, real-estate agents and the American Society of Home Inspectors, and ask the following questions of friends and neighbors who have had work done:

- Does your basement still leak? Does a contractor fix the same problem, only to create another?
- Is the work guaranteed? How about a 10-year free-estimate guarantee against leaks?
- Was your house left in good condition? Wasn't he so proud of fixing a leak in the roof to a second party or a basement in somebody

an
american
craftsman

bobdix

A master locksmith time-travels through the looking glass to solve historical mysteries.

BY WALT HARRINGTON

Late at night, as ever, Bob Dix is hunched over a workbench in a small room in a corner of his basement. A white cloth, unrolled on his lap, is the soft bed for a palm-size, battered, filthy and lifeless padlock built by—and during the Civil War—Dix is a bear of a man with a strong, resounding voice and manner, but he handles his artifact with the delicacy of a jeweler. He leans to his work, Mozart's K 424 Duo in B-flat for violin and viola floating lightly in the air, an otoscope his father the doctor used 50 years ago held to his right eye, the lock lifted to within inches. The lock is four and a half inches long, three inches wide, half an inch deep and weighs eight ounces. Its shape

PHOTOGRAPHS BY RAYMOND MEESE

One of the many elevators in Dix's basement staircase features locks manufactured between 1800 and 1850 by Yale, a company originally located in Lancaster, Pennsylvania. **CLOCKWISE:** Using an otoscope, Bob enters the 1830s world of miniature mechanisms in a padlock.



Eight locks from Dier's collection cover 500 years of history. Clockwise from top, a 16th-century German lock; a 17th-century lock, probably German; a 19th-century lock, most likely from Italy; and a 19th-century English lock. The early history of the grandfather of modern locksmithing is condensed in four locks dating from the 1600s to about 1900. At top left is the O.L. Every lock that Dier believes may be the first pin tumbler ever built.

is reminiscent of a Winston's Day beer ad, for the less romantic, a feel that has been off a big man's back. It has the coarse touch of soapstone. But through the looking glass, the strange experience of this remodeled brass lock becomes for Dier a possession of historical importance.

"But, this is during the change. It was hanging on a door and the building caught fire. Something fell on it, and the key broke off and the case got twisted in the pressure and the heat. I think that's the whole scenario. Thank God it didn't melt. Maybe it was in the Civil War. Maybe it was buried and dug out later. Heaven only knows."

The lock is returned to its bed, the museum's lead safe. The 41-year-old man, who is one of the finest locksmiths in the United States, straightens in his chair, yawns his lips and raises his brows, taking a moment to answer what he is asked to do. "This lock hasn't been opened in nearly a hundred and fifty years. It's like opening an Egyptian tomb." One of Dier's friends bought the lock—unworkable and with its key broken off in the keyhole—in a New Orleans antique shop. Named as the thief was "G. Andrews," revealing it had been built in the Perth Amboy, New Jersey, locksmith shop of Solomon Andrews. The friend paid \$40. When Dier is done, some collector will likely buy this anomaly and risk for \$4,000—40 times its cost.

This machine for a massive door, he says. Of course it shows the line of nine French rods across the lock's case, then squares and releases the trigger and lowers the drill, linking a hole into the user's hand only on the lower side of the rotor's winding run. If the he were to



Dier made a key for the English lock from about 1600 on a Regal key machine purchased in 1915. His shop is filled with old equipment that is far more precise than modern models.

Among the spoils in Don's basement are several top-of-the-line locks made by 19th-century American manufacturers long out of business.



tip off the rounded nut with the drill under power, it would mean a swirl of brass from the case, which would leave a gauge master lock safe's insides riddled in the name of historic beauty, might someday ponder in the way that Don ponder just how this padlock came to be damaged in a fire. He scoffs but soon he's an obsessive craftsman and museum to walls that are the backdrop for a cavernous art gallery of locks, some gleaming, single brass and steel, others hanging dull and ashen, locks 2,000 years old, locks still in the factory wrap.

"Everything here is a story."

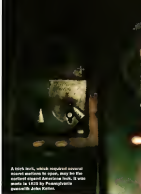
Seven thousand stories are stored in Don's Monroe, Ohio, basement, which houses probably the world's largest collection of locks. Each reveals a sliver of history. A lock from the Dark Ages is made in the unadorned, unknown style of the era. A later lock, beautifully etched, shows the emerging mastery of the Renaissance. The simple mechanisms of antique European locks contrast with the intricate, clockmaker styles of 19th-century American locksmiths. The 1,100 "logo locks" include the trade names of business giants long dead or altered times: Hudson Motor Car Co., Cadillac Cleveland Tank, Belle Isle Grocery. And the pride of the collection—the signed O. L. Sweeney lock Don believes was the first pin tumbler ever built and the precursor to the revolutionary line of locks launched in the 19th century by Linus Yale Jr. The pin tumbler allowed infinite master keying and made possible the billions of locks that today secure homes, cars, hotel rooms and offices.

"Locks are talking to you," Don says, as he gigs his drill again and it whines, digging into a softer rim. "They are living pieces of history." When the drill stops, he reaches deep for his brass chisel with his finger and examines his work through the microscope. "Okay, that one's good."

Sethman Andrews was a New Jersey dentist who also made locks. Don has smaller Andrews locks, among steel locks, pad locks. This brass lock was cheap, made for an emerging mass market. Don knows that the man who made this pad lock would clock his entry for spending 30 hours making it. But for Don, it's like a cracked dish unearthed from a vanished culture. He'll restore it, as he has thousands of others, not for the money but so it will not disappear. He stores the lock and it rests quiet.

"What's coming out is making me nervous. I don't know how much mechanism is left. The important thing is the levers. Do I have to make the levers? I will if they lose too much strength in the fire. I'm really anxious to try what's inside. I have never heard of anyone finding an original Solomon Andrews key."

Bob Drexler was 8 when his grandmother bought him his first lock, an inexpensive Sweeney. Don took it apart and put it back together. He was always taking things apart—to do so, TVs, telephones, the family clock. By the time he was 13, he'd go shopping with his mother on downtown Cleveland, and she'd drop him off at the locksmith's shop at "old man Soderman," who'd let young Don work on simple locks. He began collecting locks. After college, he took a job with Libbrand Corp., the glass perversion-additive company near Cleveland. He has worked there 39 years and today is in charge of automating the company's testing labs. But all these years, night after night, he has gone



A lock lock, which required several moved motions to open, may be the earliest elegant American lock. It was made in 1820 by Pennsylvania gunsmith John Kirtley.



Another 19th-century lock, lock again, when rivets, protruding pins and side panels are moved—in a 7-step sequence—before the key is turned.



The doorhandle is among Dix's collection of 15th-century American iron locks. The men extending up to the figure's mouth is the handle.

down to his basement covers and unfolded his white cloth.

"Here, which room is holding it?" he says, as he lightly squeezes the handle of the remote-pressure press he has opened inside the edge of the Andrews lock, where the double's iron enters, hoping to loosen it from from its back. He has drilled his tiny holes at the corners that hold the front and the back of the case together, because he wants to twist to many times as he can. If they are steady enough, he'll have a small a tiny screw in the top of each one. The screw-cuts will snap off with pressure and leave a protruding up stop the rest that he will then round off to perfectly smooth the corners up of the original cover.

After drilling his holes, Dix files off the cover's rounded tops, leaving only a half-thin lip to hold them in place. Then, with a tiny jeweler's sawdriver, he chisels off the lips, leaving nothing but corners to hold the case together. "Let's put a nice, even force." He gently squeezes his pliers—pop. "Nice voice the Carol Wre." he whispers, and him off the lid of the cloth. "Oh, my goodness. There's the mechanism."

He does a quick inventory. Four, maybe five of the case covers are round beyond comparison. The lock was definitely in a fire, its back distorted from melting. But it wasn't broken, so it's the reason of the lock's broken key is in fact, meaning it could be the original key, the true Solomon Andrews key he has now discovered. So says, but the leading edge of the key was cut at a 30-degree angle, something Dix has never seen. The lock's wheels are ingeniously simple four-wheeled springs that served as both levers and bolts, supplying pressure to open the lock and pressure to close it. But Dix can't yet tell how it worked.

"I have to sit here and figure it out."

Never has Dix reached a lock he hasn't figured out. He can put his lock-picking tools in a keyhole, and in a matter of moments the lock is open. After 42 years of working with locks, he actually wonders how the mechanism must be built to fit into a certain case. He can find the machine's language through his fingertips. He once opened a pair of Healds handcuffs in 20 minutes. He once rebuilt a famous 18th-century P. H. Hart track lock that had lost its entire outside. He would sit in his empty lock—a puzzle frame without parts—for three years. One day, as a flash, he saw the only combination of parts and mechanism that would fit. The collector for whom Dix was rebuilding the lock refused to take it back, so Dix was left by the achievement. "It's your lock now," he said.

Dix doesn't just sit down and deconstruct things. He'll carry a lock in his pocket for days or weeks, take it out and flip it in his hand while studying a computer program at work or watching the History Channel at home. He doesn't think about opening the lock. He has what he calls his subconscious mind the answer. "It's like it comes at a waking dream." He once left an antique Pym lock, a lock nearly impossible to pick, at his workbench for six months. Then, as he was watching a movie with his wife, he had an urge to go look at the lock. He walked downstairs, opened it in 10 seconds and returned to the movie.

"I hadn't been able to open it before, and I bet I couldn't open it now it was very strange." He laughs uncontrollably. "The Zns, if you will. It's like, well, you're at another plane with this lock, which sounds to me for somebody at chemistry and computer science to say. But I see it. There

are times I fit a key, and I know where to make the cut in that key, and I can't explain how I know. It's got to be memory from experience and intuition. But it's not simple. I lost track of time. My wife got mad at me. It can be two or three in the morning, I don't even know it."

"Unless you happened it, it's hard to describe. If you try to talk to somebody who doesn't understand, they think you're nuts. You don't talk about the state of mind you need to be in to do that work." It's the same state of mind Dix believes the best people at a top field must also seek. The greatest musicians aren't only technically proficient, Dix knows, but also much a sensitive place with their music. So too great athletes, artists, writers, actors, scientists. Scientists know the same facts as other physicians, but he looked at the pend's empty frame and saw the only way the pieces of time, space and matter could fit. "It's a mind-set," Dix says. Craftsmen—suppos-

edly simple, practical, hands-on people—are thought to be outside that intuitive realm, but Dix knows they are not. "It's spooky stuff, but that's how a good."

John-Maria Lada's Sons, Op. 3, No. 4 at P. is floating lightly at the air. Dix has for hours now studied the piece of the Andrews lock in an otherwise plain that causes motion of top exploding bulbs that cause the motion. He has polished the year and decided to a ball-sized antique brass, giving it the smooth feel of a second-hand glass. With a wrench, he has carefully covered the lever bolts, all but those of the front and the broken



In Dix's system the clock-like precision of his multiple-brick lock, dating from about 1640, makes it perhaps the finest example of American watchmaking for a single lock.

mechanism that would have kept it from opening with a standard key. Dix suggests Andrews says, "What are we gonna do?" For the locksmith whose attention drifted on the angled cut, Dix has great respect. But he suspects this lovely lock design was quickly abandoned.

Dix has put to rest the people's puzzle lock in their dream. He once tried to make the new brass as his last, not a new key from the original key. But he had chemically tried the lock to create a deep brown patina that will evolve an elegantly aged character: respectful of its age. Then Dix has performed one final act before he closes the case for good. He will risk his name inside the lock of Solomon Andrews and become known a piece of its story.

A century and a half north of grit and corrosion, new movement from the Solomon Andrews lock.



TIPS FROM THE LOCK DOG

- Don't bother spending a lot on high-security bank locks for your home. It's obvious, because most intruders won't bother to pick your lock anyway. They're going to hit in your door. "Put your money in the dead bolt," he says. The dead bolt should extend into a steel-reinforced receptacle—the strike—held in place with at least two-inch steel screws. Also, the security start screws that hold the lock-bolt assembly in the door should be replaced with two-inch steel screws. If you have a door with glass in it, consider a double dead-bolt cylinder (that is, two dead bolts) with a key that can be removed when you leave the house.
- For added home security, Dix suggests inexpensive, automatic, motion-sensitive door lights in critical areas around your house.
- For a garage door lock, he recommends an overhead pin-and-tumbler padlock. These kinds of locks are not likely to quickly activate.
- For lifestyle security, Dix says, use a large U-shaped shoulder lock and be sure to secure the frame and the wheel together in a stationary object. The main idea is to show thieves down. "These people don't want to be standing there," he says.

the menace of mold and mildew

Confronting a biological hazard that can be harmful to your house and your health

TUTTERING WITH GREENING AND DRIZZLED BY PERENNIAL ANNOYING headaches, Debra Dawson felt her life falling apart after she moved into a new house on a placid cul de sac in Seminole, Florida, 10 years ago. At 33, she had to ask her mother for assistance with grocery shopping. "I couldn't walk straight down the aisle. I'd go three miles in one. I remember being at a tennis function and being so dizzy I thought I would fall down. I had to hold onto the cable." Her son's own room asked for help in a mere 10 minutes. Dawson tried, but got too tired to stay in the house. She went to one doctor, then another. "I took antihistamines, decongestants, steroids, steroid nasal sprays, antibiotics, cough medicines. And when it was really bad, they'd even give me steroid shots in the office."

Told she was suffering from an allergic reaction, Dawson assumed her lifelong hay fever had taken a dramatic turn for the worse. So she stopped making as much as possible, kept the windows shut and bought expensive filters recommended by an air-conditioning manufacturer. Nothing helped. Then, two years ago, during a two-week vacation in New England, Dawson felt wonderful—no headaches, no sneezing, no sinus trouble. She decided returning to Florida. When the trouble forced her to stop for a while 20 miles from home, she was surprised that she still felt great. The next day she walked through her own front door and within half an hour her headaches and sneezes were back.

Finally Dawson realized the problem wasn't Florida, it was the house. An air-flow-in-quality technician solved the mystery when he popped open an air-conditioning air handler and revealed mold so thick it looked like cotton. "When you turn on the technician felt sick too."

When those workers came to vacuum the ducts and hose down the air handler, Dawson's husband, Ray, was worried that they were where mosquitoes, or if they were working on a nuclear reactor. "Suddenly you go, 'Holy Toledo, we've been living on this!'"

Like most people, the Dawsons thought of mold as blue spots on bread or black spots on the grass around the sidewalk—a minor household nuisance.

BY SUSAN RENESCH

PHOTOGRAPHS BY
JOHN KERNICK



Like a nightmare coming to life, the mold lives in a closet and bathroom of this 1930s bungalow in Miami, North Carolina, where water can happen when infrastructure problems are ignored. While the house was built up for 60 years, the roof began to leak. The rain bathroom's floor was leaking, allowing mold to proliferate the mold.



Molds from the North Carolina farmhouse (pictured on a previous page) reveal some of their secrets under a microscope. After the rest of the house was repaired, the newly smelly dampness disappeared. But when an air-quality expert went in at this Old Farmer magazine's request, he found the air was still loaded with five mold species—up to 20 times more than in the air outside. In one bedroom, where a sweater had passed its, he found the most toxic mold, *Stachybotrys atra*, often, if not growing on paper, right, that peeked from the detached ceiling.

voraciousfungi

Mold and mildew are interchangeable names for thousands of species of filamentous fungi. Clusters of spores perched on the ends of tiny stalks may be brown, black, green, blue, pink or white. Some look fuzzy, others slimy. The spores are the fruit of a multicellular, often wetlike body, a mycelium, which like parasitic mushrooms as they roots extend into the earth.

Both the mycelia and spores may contain compounds that make people sick, but spores pose the biggest health concern because they are the most likely to be inhaled. They are only 1 to 10 microns long (1 micron would fit on the head of a pin), as they float easily and invisibly in air.

Molds grow at temperatures between 55 and 98 degrees Fahrenheit, but many species do best in the 70s and 80s, the most common household temperatures. They require either water or a relative humidity above 60 percent. Most dead organic materials can support them—mold is one of nature's primary recycling agents. Even the oil in a fingerprint will do. Molds can digest the cellulose in paper but not the cellulose in wood. Thus, although they grow on and discolor paint and wood surfaces, they do not rot wood.

As a byproduct of digestion, molds release volatile organic compounds such as ethylbenzene, ethoxide and hexane. These give inside their murky dots, if a mold stage growing, digestive steps and as the mold, but the mold is only dormant, ready to resume feeding when conditions are suitable.



The mold-infested farmhouse in Kinston, North Carolina, was a 3,300-square-foot wedding present to Gene "Triandis" from his new bride, Ricki Strickland. "I like the moldiness," he says cheerily, "who does the cleaning?" Triandis used bleach for the cleanup because mold did not penetrate the hard surface of the plaster walls. With drywall, however, scrubbing with bleach will not help if mold has penetrated the outer layer of paper.

since are more dangerous than mildew. Yet most of the poisonous fungi commonly known as mold can be a serious health hazard. As they feed on paper and other common materials in homes, molds produce compounds that may cause strong allergic reactions in 15 percent of the population. Some molds also produce poisonous compounds that can make anyone sick.

"Mold contamination is of far greater consequence than is generally recognized," says Jeffrey C. May, a home inspector in Massachusetts who estimates that one in every 10 houses he has examined in the past several years was moldy enough to make an occupancy rule. "In fact, mold could be the source of serious pollution with the most widespread impact on health."

In extreme cases, mold might even be deadly. In the early 1990s, all four family members and a cat in a suburban Chicago house reported the like symptoms, often swollen and itchy. Doctors were baffled until the family discovered mold on such things as air ducts and on a ceiling under a roof leak. When chemists injected samples from those molds, including one called *Stachybotrys atra*, into five rats and five mice, the animals died within 24 hours. The family's symptoms improved after the house was cleared of mold, says Bruce Jarvis, a University of Maryland chemistry professor who worked on the case.

Three years ago, pediatricians in Cleveland were alerted when several babies developed a rare form of bleeding in the lungs. Since then, 23 babies in the city have been diagnosed with the same symptom and none have died. Nearly all lived in old, poorly maintained houses with water damage from roof leaks or flooded basements and, as a result, large amounts of *Stachybotrys atra* mold. Dave Dearbeaux, a pediatric pulmonologist who treated most of the babies, says mold is the most likely cause of the deaths. Nevertheless, some mold specialists maintain that a lethal dose of spores would be enormous, more than anyone is likely to inhale in a home. Even even the most skeptical among them say there is a clear correlation between dampness or mold in houses and respiratory distress.

Many people assume modern houses are protected against mold, but often it's just the opposite. Until the 1970s of energy and the subsequent emphasis on energy-efficient construction, many houses were so leaky that moisture generated



follow your nose

The best tools for detecting mold are beam sensors. "We could do mold air work with a flashlight and a nose," says Michael Landerelli, an indoor-air-quality specialist for Palm Beach County, Florida. Even if mold is growing behind a wall, sensors can be detected because spores flow out through electrical outlets and wall cracks.

To identify the source of the mold, look for water that may be coming from plumbing leaks, plugged gutters and moist soil seeping against walls. For roof leaks, check in the attic with a flashlight, especially along the eaves and at joints under flashing. Rusty nails can be a clue.

Once leaks are ruled out, consider airborne moisture. In hot, humid climates, outside air is the primary source. If an air conditioner is used during the day, windows should be closed at night even if the temperature is pleasant. In colder, drier climates, humidity often comes from within the house. Dry single-rungs, such as smoking with late-at-night and smoking curtains on cold winter days to wonder about the humidity window joints can dry. In the bathroom, leave the door open after a shower and take towels elsewhere to dry. Exhaust fans can also help, especially in bathrooms and the kitchen. Make sure they vent to the outside, not into the attic. The top-of-the-line venting solution is an air-to-air heat exchanger, a device that allows stale indoor air to escape through one pipe in protected fresh air coming through a neighboring pipe. A whole-house model costs \$2,000 to \$3,000.

In some cases, it may pay to buy a portable dehumidifier. Most models for less than \$200. The water removed should be emptied regularly as mold and bacteria may grow in the tub. A 3000-gram capacity, a device that absorbs relative humidity, can help determine how to adjust the dehumidifier so that it keeps the relative humidity below 60 percent. If a hygrometer indicates the relative humidity is below 60 percent, try raising the thermostat on the air conditioner a few degrees to decrease the relative humidity.

made mold escape. "When the building was making her plan to, you could feel spores all day long, you could see a shower all day long," says Richard Trishewy, The Old House's expert on indoor air quality. "But the modern house—the house built from 1975 on—is a tight thermal house. What ever humidity we create can't escape. That's why the mold problems tend to come."

In the hot, humid Southeast, homes need to have ceiling fans, windows that could be opened up and houses and two-sided shutters to facilitate moving air, which can evaporate the moisture on which mold depends. Nineteenth-century homeowners took down sawdusts that might become moldy in the rainy summer months, as Mary Telford of Savannah, Georgia, described in a letter on May 15, 1877: "Summer has on us with us and we are beginning to suspect and suspect."

Today, many homeowners mistakenly think they are protected by the dehumidifying power of air conditioning and central heating. But these systems can actually increase mold because cold air cannot hold as much moisture as warm air. Condensation can form where warm air touches a cold surface, such as on the outside of air conditioned floor boards. "It's just like the outside of a Coke can," says Robert Scary, a microbiologist at Pure Air Control Services, a Florida indoor-air-quality company.

Few people realize that average air conditioning is a key source of trouble. "Humidity, the consumer thinks that bigger is better," Trishewy says. "Someone wants an air conditioner that can cool the house in 10 minutes." But if an air conditioner cools too fast, a circulator—and dehumidifier—only a small percentage of the house's air, that share off. This leaves the relative humidity high and often causes condensation inside ducts. If ducts don't in the system to serve as food for mold, the fungi can grow unchecked in the way places where their spores are more easily blown through the house. That's what caused Debra Bowman's illness.

Almost as soon as the mold in Bowman's house was cleaned up, she felt comfortable. "I wasn't coughing up, I wasn't dizzy. All my symptoms were gone. It's unbelievable. My life has totally changed. Before, I'd try to play tennis once a week. Sometimes I'd be sick. I couldn't play. Now we found the mold, I've been comfortable."

Ray Bowman keeps a piece of the mold as a clean peace-keeper just to show visitors. "It's like a little war," he says, staring at it in wonder. "You never think of mold growing in your house to the extent that it becomes a health hazard."



Her asthma returned, Debra Bowman took evidence of the mold that once grew in her home's air ducts.

PHOTO BY JEFFREY M. HARRIS

counterattack

For mold on a porous surface, such as

add-tackling plastic, the solution is relatively simple. First, set up a fan to blow fresh air toward you. It will remove more than 10 square feet, tops off moisture in the room with plastic and set a fan in a window to blow air out while you are working.

You'll also need goggles, rubber gloves and a high-efficiency particulate air-purifying (HEPA) respirator equipped with a charcoal cartridge. Using a bleach solution—one ounce sodium-bleach detergent, one quart household bleach and three quarts water—wet each moldy spot for at least five seconds. Rinse the surface well and dump the waste water down the drain or toilet.

Then use a HEPA vacuum, which can be rented, throughout the affected area. (An ordinary vacuum will stir up lingering spores that won't remove them.)

For mold on a porous surface, such as drywall or wallpaper, wipe the bleach and remove the material itself. Keep the rest of the house clean by placing contaminated materials in double bags and bring them out through whatever is possible.

If heating or air-conditioning ducts are contaminated, make sure the contractor you call is certified by the National Air Duct Cleaners Association. Duct cleaners typically use compressed air, HEPA vacuums and brushes or

short blades. Fiberglass-lined ducts are easily damaged by stiff brushes and very high-pressure compressed air. They should be carefully vacuumed with a wet brush, advises Steve Gendron, vice president of Environmental, a duct-cleaning company in Cambridge, Massachusetts. If that's not sufficient, the ductwork may have to be replaced.



A professional cleanup crew kills and vacuums away mold from an apartment in New York City. The workers seal off the area with plastic and use a special vacuum that captures the bulk of mold spores.

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MOLDINGS

First a board takes shape, then the room

Without moldings, a room is raw. They fill the gaps between floor and walls and around doors and windows, weaving up the often jarring marriage of different materials. Their profiles—built combinations of edges, flats and curves—make eye-catching bands of light and shadow that add texture, depth and warmth.

There are thousands of profiles, yet all are made the same way: Smooth, steam-bent boards are fed into a powerful machine that whips them into

shape at 3,000 rpm, and out comes fast after heated vinyl profile 20 to 30 feet of it is made. For such a straightforward process, the results vary

greatly. Use other materials, including heavier stock, better cutters, and custom yields, manufactured in large quantities, they have relatively

fewer flaws. Dimensions and tolerances. But flaws are the moldings that most people choose, and they do the job—covering cracks and adding detail—just with imperfect means.

Stock hardwood moldings are a snap up throughout. Also available

home centers and lumberyards and milled mostly from oak, they

offer larger dimensions and closer profiles than run-of-the-mill pine.

The best moldings are made of wood that is thicker and wider with

profiles more pronounced and complex. They come from local mills

and mail-order suppliers, both of which may have invents for hundreds

of profiles. Some will grind new knife sets for custom profiles.

Most big-name moldings are made of poplar, a hardwood that machines

cleanly and doesn't have a strong grain pattern. Poplar, the pine is a

choice for the owner of the, and is milled in an extremely

skill, and on request a mill will usually run up only very often

Before its finished, any grade of molding needs about a week,

specialized fed in the floor, to acclimate to its new home. This will help

to know that joints and seams stay tight. Joints should always be

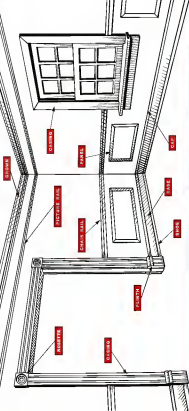
glued, and to prevent cracking the finish should be sealed with paint or

varnish. The face should always be sanded before painting and

between coats. But don't lightly or heavily chip profiles don't get out

A MOLDING PRIMER

If profiles were sugar, a Book of Moldings would be thousands long. But there would only be a few chapters. The basic types of moldings shown here are generally named for where they go or what they do. Master a couple of dozen more words—the origin and repeat (see other side) and primer (see below)—and you'll be fluent in molding nomenclature.



BASE, ROSETTE A classic rosette is five feet of a wide base of a wall, sometimes with a decorative panel. The rosette is a decorative panel, sometimes with a decorative panel. The rosette is a decorative panel, sometimes with a decorative panel.

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C E T A C H W H E E



CROWN

MOLDINGS

PHOTOGRAPHS BY DARRIN HASSAD ILLUSTRATIONS BY CLANCY SIBSON



PICTURE RAIL



WINDOW AND DOOR CASING



ROSETTE



THE PIECES IN THIS COLLECTION, a small sample of the tremendous variety of moldings, represent a nation's wealth of applications. Yet single profiles alone do not account for all the possibilities because moldings can be combined to produce still more effects. Moldings can also be dissimilar. Turn a corner after you start with a single decorative piece. The part of the profile they head, then joining an end, that find out the supplier often only standard lengths or if it will cut—and only charge for—the lengths you want. The best molding is expensive, but it's better to have some left over than to come up short. A wall will gladly run over, but there will be another setup fee, and the new sleek might not perfectly match the first shipment.

CROWN moldings are usually flat, or apron, from the wall with the deepest and most complex angles running along the lower edge, which creates a shadow and a series of depths. For a bolder look, crowns can be joggled out from wall and ceiling with flat planes of wood that create additional recesses of light and shadow. **PICTURE RAILS** have a thick, rounded top edge for holding a small hook. This permits hanging and arranging pictures without making holes in the wall. Most **CHAIR RAILS** have a pronounced receding element, traditionally for keeping chair backs away from walls. The angled along with the back of **PANEL** molding of the doorway.

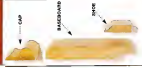
PILASTER



PANEL



BASE PARTS

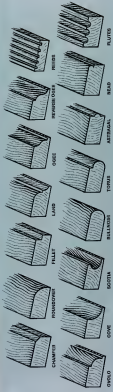


BASEBOARD



Parts of the Profile

All moldings are composed of three basic shapes, 15 varied notes that can be reduced or enlarged, stretched or skewed to help an individual of tastes.



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with **History**

Restoring an elegant
cast-iron and glass
shelter for plants

BY DEAN EDECOCK PHOTOGRAPHS BY MICHEL MCGUINLIN

Working from a ladder that rests in what will be a 14-foot-long exercise path, Mark Ward builds a steel collar to the new wing of the house. Cypress panels placed exterior to the collar will support the glass. When this greenhouse was first built in the 1930s, the glass rose from a masonry wall about 20 inches high. In the greenhouse's new life, most of the wall is cut below ground level, allowing access from both the living room and the basement. Plants will grow inside of the for end, by the front door.



WISDOM OF GREEN WORK, job-creating expert Susan Shaw set out 15 years ago to design her own new career as a painter and horticulturalist. She put her glass idea aside in a way that gardeners who buy plants before they prepare the soil can appreciate. The first thing she did was shop for a greenhouse. When a landscaper responded to her ad and offered a disassembled one for \$1,100, she was intrigued. She contacted Mark Ward, who has been designing and building greenhouses, sunrooms and sleepheims, largely from recycled material, for two decades. She told him the parts were made by Lord & Burghall, a New York firm that began constructing greenhouses during the Civil War.

Ward reverses the company's work. "There's an elegance," he says, struggling to explain what is best understood by touching the carving spokes of one of the wheels that operates the greenhouse's side vents. "There are all these wonderful cast-iron bits and cast-iron cranks and shelf brackets. On some level, it's sort of the difference between wooden boats and fiberglass boats. They look like the job, but to some people—to many people—it's more aesthetically pleasing."

Shaw bought the greenhouse parts and carried them home. She moved the heap of more than a thousand pieces again when she bought land in Wyoming, Rhode Island. While the parts waited in a pile behind a porch shed, she worked at a garden center, managed several commercial greenhouses of the same 1930s vintage as her own, designed and built a small house on the property and got married. Finally, in March 1994, Shaw and her husband, John Burroughs, began preparing to rebuild their house. With Ward's help, they planned to erect the greenhouse as a lean-to connected to a new wing.

In one day last fall, Ward found himself screwing in an old cap-shaped hook of cast iron. He recognized it as part of a pump. But to find out which part, he would have to keep coming at it. Although he had salvaged many old Lord & Burghall blueprints, he had none for Shaw's design.

Most of the components were still in irretrievably good shape, and Ward was able to discard ones that weren't because the lean-to would be only half the width of the original stand-alone structure. He replaced only the basement, which had been sitting in a broken fall of water and were moved.

Because Shaw and Burroughs were building a new wing, they were able to integrate the greenhouse more than is usually possible. Its walls are partially underground, a lowering doorspans into both the basement and the living room. Between the greenhouse and the new wing is a stretch of nearly continuous windows, some of which open. Air can flow from the outside into the greenhouse through its side vents, then into the house and out again via a coastal vent at the top of the living room—or someone intended to help warm the house as the winter and coal in the furnace. Shaw and Burroughs are counting on the coastal vent to keep their house from becoming too humid, a common problem when greenhouses open two living spaces.

On this project, the main beam was to cross three all during, then jigger the glass in its the space.

For landscaping and in-house: Inter-cypress panel removed a small been gone for opening the main, some. With the moved glass in place, Ward's assistant, John Lee, serves an aluminum bar cap across the top.

Greenhouse glass is imported but alternatives are in house, on the bar cap will also provide a base for the plant wires. Another Ward uses a stainless steel in position to try glass. All the parts are new, however the strength will siding. The more people moved panels are slightly, started to separate again.



One Wheel or Two?

Taking the challenge out of chores

THE TYPICAL GARDEN runs on wheels. For every plant that grows, a trowel, there are rocks to move, fertilizer to bag, and a cart and wheelbarrow to transport it. If horticulture predates the wheel, it won't be by very long.

The word "wheelbarrow" has been in the English language at least since the 14th century, and centuries of the heavily used wheel cart must surely have rolled down Roman roads. But nowadays, wheelbarrows are only part of the tools on our garden paths. One wheel or two, plastic or metal, ashlike or collapsible, a bewildering array of choices is available.

"Ideally, you need three hand-pushed vehicles around the garden," says Ron Monish. First, there's the traditional single-wheel wheelbarrow. "It's usable, it's tough on your back, and you can't tilt it down to pick up heavy objects," he says. "But a well-run" he best when you have a narrow path to negotiate."

Another mainstay is Rans' line of a two-wheel garden cart, the kind with handle-type wheels and sides of exterior-grade plywood. "These are great for hauling bulky debris," he says, "and they're the only ones I've found that can take two full-size trash barrels out to the curb."

Some two-wheelers carry the best features of the wheelbarrow and the garden cart. One offers the option of locking both wheels

so they could be braked for a true wheelbarrow effect, or spacing them farther apart for greater stability. Another is a big plastic two-wheel top cart, it can carry a heavy, dense load such as soil or gravel and tilt them up forward for emptying without the hassle of a one-wheel balancing act. One model even

spins fast, pneumatic inner tubes, an advantage with grinding loads. The manufacturer claims it can hold up to 700 pounds—more than you'll want to thrust down a path between the tomatoes and the squids.

The last of the big three is something that rarely comes to mind for garden chores: a two-wheel hand truck, the load carriers are for hauling refrigerators and box barrels. With an easy fold-down and low center of gravity, a hand truck can transport fence sections, heavy tools, bags of lime or cement, big rocks or just a hoist any item that would be tough to manhandle off the ground and use as a carrier. First, too, pneumatic tires are best.

If storage space is tight, consider a folding carrier, too be careful. Some manufacturers make too many compromises, producing carts that are compact but don't open and close properly. Another option is to store large carts outside, upside down.

What if you only have room for one set of garden wheels? Makes that "wheel," Ron says. "If I could have only one carrier, I'd make it a wheelbarrow, if for no other reason than that there are places where you just can't maneuver a two-wheel cart. But it would have to be big enough—a capacity of at least a third of a cubic yard. A too-small wheelbarrow is of no use. You're always overloading it, and it's always tipping."

The best general-purpose carrier is a standard wheelbarrow. Ron says. He suggests buying a wheelbarrow with replaceable rubber tires and a polypropylene top. Plastic doesn't rot, but it's important because garden carriers should be tough enough to be stored outside if necessary. Tube-type pneumatic tires are good because the tube can be topped up with a hand pump, patched or even replaced.



1 The classic garden wheelbarrow is a good choice for most tasks.

Specialty Carts

- 1 A hand truck is one of the toughest parts of moving a heavy rock lifting it.
- 2 For hauling bulky items, a pneumatic-tired cart with bicycle-type tires is the best option. It tips forward to make loading and unloading easier.
- 3 This aluminum fold-up model is similar to the plywood cart, but we discovered it suffers from a high center of gravity and poor weight distribution, when loaded, it flipped over as we let go of the handle.
- 4 Although it's made of plastic, we liked this deck cart, which also folds. It's suitable for carrying only light loads, but it's handy and well-balanced.





图 2-1-1 所示。图中， α 为前角， β 为后角， γ 为楔角， δ 为刃倾角， λ 为刃偏角， θ 为切削角， ϕ 为切削角， ψ 为切削角， χ 为切削角。



P-24-Haul cleaners Tronox Inc.
 Orange Municipal Solid Waste
 64 on pump contracts, \$16.90, Lucile
 Corp., 1801 Town Brook Grouping,
 Rocky Hill, CT 06067, 860-371-5211.
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 OH 44122, 800-121-6330.
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 2625 E. 12th St., Tulsa, OK 74103,
 800-396-0077.
 Haulers 100 on, \$10.00, Grease & Grease
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 Elmer Inc., 20070 Mills Rd., Cleveland,
 OH 44128, 800-729-1875.
 Lawn Haul 10 on, \$10.00, Haul Haul
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 87302, 281-434 3000.
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 5647.
 Special Haulers 3 on, \$3.00
 per day, Van Vleet Tools Ltd., 12 E
 Kane St., Ligonizing, OH 44130, 877-
 472-1231.
 See also: Airports
 Solid Waste for Commercial
 Safety & Health, 675 Columbia Plaza,
 Bldg 3A, R-70, Cincinnati, OH 45226,
 800-556-6770.

p. 25—Sawase: Jim Fishback, Fishback Designs, 2283 Winden Dr., Asanoff, CA 94001, 770-946-7471. VBM: Jim Brown, public affairs, Presidential Real Estate Advisors, 3200 Park Center Dr., 34th fl., Costa Mesa, CA 92626, 714-444-6534. Stephen Kravitz, Sericos, Century 21 Stephens Associates, 3104 E. 30, Phoenix, AZ 85014, 602-944-7700.

p. 36—**Tween Lookouts: How to Find a Fine Lookout in the Pacific Northwest**, by Tim Foley and Tim Seabald, 206 pp., 1996, \$13.95, Wilderness Press, 2440 Euclid Way, Berkeley, CA 94704, 202-443-7127. *Review: Michael*

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 us 850-6632, 548, T.C. Timber Co.,
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8372. Lives commences Pyro Lane,
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p. 34—Compact home. Home/Me, 387
Merrill Rd., Solvang, CA 93464, 805
873-1426. Braided stainless house/Plu
closures, Dux-4244, 1800 Van Arman,
Anaheim, CA 92805, 714 776-1444
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St., North Andover, MA 01843 (800)
338-6833/3732. *Shawn* Wilson, in wall

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Directory

ADORE pp. 70-75



Current editorial advice: *Mud* is 98 cents; *Teen* Adore West, £1300 '97 Ave Valley Rd., Marina, AZ 81652; 520-652-2674. *Washboard* costing: *Washboard* £200 GP, £1 gal., \$94.75; *Provo* Inc., Box 1175, Kansas City, MO 64113; 913-232-1700.

Further readings: *Adore*, *Book* D. Noveck, 1985, 116 pp., \$12.50; *University of America Press*, 1216 N. Park Ave., Suite 202, Tucson, AZ 85714; 800-436-1797. Our thanks to Michael Kunk, general contractor, Contemporary West Design.

apartment Inc., 3915 E. Camino De Pablos, Tucson, AZ 85711, 520-881-0944. Eric Morris, owner and general contractor, *Moore Design & Building Corp.*, 1219 E. Pecos Pkwy, Tucson, AZ 85718, 520-297-5111. Bob Vint, principal architect, *Bob Vint & Associates*, 140 S. Santa Ave., Tucson, AZ 85703, 520-352-5212. Arnold Belasco, *Belasco Electric*, 7325 N. Joplin, Tucson, AZ 85745, 520-744-2119.

MOUNT VERNON pp. 76-83



George Washington's Mount Vernon Estate & Gardens, Box 130, Mount Ver-

non, VA 22132; 703-799-4800; <http://www.mountvernon.org>. Further readings: *A Fight Gone On: America's Most, by Virginia and Lee Matheis*, 1994, 323 pp., \$21.95; *Alfred A. Knopf*, New York, 800-726-5680. Our thanks to: *The Mount Vernon Ladies' Association* and James C. Ross, director, and Judy A. McDermott, manager of media relations, *Mount Vernon Estate and Gardens*.

WET BASEMENT pp. 84-89



Waterproofing: G.S. Business Waterproofing Inc., 39 Pleasantville Rd.,

Directory

Pleasantville, NJ 08578, 609-892-1121. John J. Antonacci, civil engineer, 24 Cherry Rd., White Plains, NY 10622, 914-949-0378.

Hydraulic cement: *Drylok Fast Plug*, \$11 per 10 lb. bag, *United Gypsum Lbs. (UGL)*, Box 78, Jonestown, PA 15031-0070, 800-278-5216. *Water plug*, \$12 per 16 lb., *Harris Specialty Chemicals*, 16245 Canterbury Place, Jacksonville, FL 32256, 904-327-1579. For more information: For a listing of licensed home inspectors in your area and a free pamphlet, "We Examiners and Great Spots," send a note to: *American Society of Home Inspectors*, Box 91181, Peoria, IL 61691-0181; fax 800-290-1929.

LOCKSMITH pp. 89-97

Locksmith: *Ruben* Inc., 8468 Cooper Lane, Menard, OH 44660. For more information: *Lock Masters of America Inc.*, open Tuesday-Saturday, May October (vacation brochure).

updates book and rules and order form, 230 Main St., Box 104, Torrville, CT 06784 0004, 860-369-4319.

Further readings: *American Lock Collectors Association Newsletter*, \$16 annual subscription (6 issues), 36076 Greenfield St., Lucerne, NY 14516; 315-522-0920. *The Padlock Collector*, by Franklin M. Arnold, 6th ed., 1994, \$21.99, *The Collector*, Box 211, Glenview, CA 91711.



Our thanks to: *Thomas H. Heston*, owner, *Lock Museum of America*; *Charles W. Chondra*, publisher, *American Lock Collectors Association Newsletter*.

MOLD AND MILDEW pp. 98-103



HEPA vacuum: *Naltek* RCS 80, 5075, *Naltek of America Inc.*, 100 Technology Dr., Mahan, PA 15110, 800-693-1675. *Mold inspection*: *Pure Air Control Inc.*, 4921 Cambridge Dr., Suite C, Glenview, IL 60020, 800-622-7873; *John C. May*, 1222 Cambridge St., Cambridge, MA 02139, 617-354-0532; *http://www.pureair.com/enr-pure*. *Mold Remediation* Inc., 140 E. 61st St., 2nd fl., New York, NY 10021; 212-719-1365. *Air-quality testing*: *Air Quality Services*, 1337 Capital Circle, Atlanta, GA 30667, 800-759-0419.

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Microscopic photography: Micro-Coloring Technologies, 415 South St. NW, Suite M-68, Atlanta, GA 30318, 404-248-7082, fax 404-243-2729.
For more information: National Air Duct Cleaners Association, 1514 K St. NW, Washington, DC 20005, 202-737-2936, <http://www.nadca.com>.
The Institute of Food & Agricultural Sciences of the University of Florida: Mosconi and Midway Web site, <http://www.mosconi.com>.
Further reading: "Clean up Procedures for Mold in Houses," *Canada Mortgage & Housing Corp.*, 1993, 32 pp., \$2 (plus \$2 shipping and handling), CMHC Publications, Box 1077, Markham, Ontario, Canada L3R 6G4; 416-332-2810. "The Inside Story: A Guide to Indoor Air Quality," EPA, 1403 Information Clearinghouse, Box 37133, Washington, DC 20513-7133, 800-438-4318.

MOLDING POSTER pg. 104



Molding samples provided by: Casar Lumber Co., 81 Fulton St., Box 2342, Passaic, NJ 07656, 201-742-8300, fax 201-742-8383. **Country Hardware Products, 37 Gayfield Rd., Gaylordville, CT 06755, 930 628-8694.**
Mid-order molding suppliers: Forrester Molding & Lumber Co. Inc., 132 Phoenix St., Leominster, MA 01453, 508-840-3100. **Tan Coats Mfg. Co., 221 81 Shaw Rd., Berling, NJ 08566, 703-450-6464.** **The Midwest State, Box 4, Box 4274, Minneapolis, MN 55401, 612-670-6435.** **Any Co. Inc. in Burlington, Mass. Casar Lumber & Mfg. Co., 6001 E. Central Ave., Bedford Park, IL 60126-6399, 708-412-4186, fax 708-438-4992.** **Mosconi & Shepley Inc. Inc., 322 Newbury Ave., Glenbury, CT 06033, fax 612-2362.** **Pennington Molding & Millwork Co. Inc., Box 975, Passaic, NJ 07654.**

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For 3D 3D 3D: Milan W. Bailey Co. Inc., Box 176, Glen Burnie, MD 21060, 410-638-5920, fax 410-638-0973. **Alexander Molding, 35 Locust St., E. Alexandria, Ontario, Canada K0C 1A6, 800-641-8744.** **Selco Millwork Co., 343 East 4th Ave., Kalamazoo, MI 49004, 616-349-3441.**



For more information: Wood Molding & Millwork Products Association, Box 21278, Portland, OR 97223, 503-292-5258.

GREENHOUSE pg. 103-106



Greenhouse builders: Mark Ward, Wood Greenhouses, 341 Lexington Rd., Concord, MA 01740, 508-363-1334.
For more information: Hiking Greenhouse Association, membership includes quarterly newsletter and magazine, seed catalogs, discount books, access to experts and library (over 1000), \$15 annual dues, 4 Glen Terrace, Bedford, MA 01730 3049, 617-275-8277.
Further reading: *Greenhouse Gardener's Companion*, Steve Smith, 1992, 344 pp., \$16.95, Falcous Publishing Inc., 350 Indiana St., Suite 350, Colorado, CO 80402-6653, 800-962-2809. *The Book of the Conservatory*, by Peter Montan, 1993, 174 pp., \$19.95, Windward & Nicholas, London, England, available from Trafalgar Square, Box 257, N. Pompton, NJ 07653, 800-422-4323.

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PAY DIRT pg. 108



Caravanous plants: California Caravans, 7610 Tronson Hardsburg Rd., Fawnsville, CA 95436, 707-838-1634, Web site <http://goldensun.com/california/>. **Costa plants:** A. Moring, 19832, 5019, 301 (over 1,300 square feet), \$19.95, Garden Alert, 5330 Schmaley Pl., Leesville, IN 47325, 812-377-5000. **Commercial greenhouse landscape:** Garden Care, 28 St. (over 3,500 square feet), \$14.75, Riverside Nursery, 51 New Mill River Rd., Hawthorne, NY 10733, 914-767-6300. **Neighborhood urbanism:** Michael Meyers, 2148 Seneca Dr., Louisville, KY 40201, 502-433-2130. **Next nature:** Takag Root Center #10-1206, 516, Takag Root Center, 237 A. Fagundes St., Wilmington, CA 90794, 310-313-2133, fax 310-313-2199, E-mail: chickens@netcom. **Early spring:** "Tactical Activity of Northern Vegetation: Induced from Atmospheric CO2 Measurements," is study by the Carbon Dioxide Research Group by C.D. Kerling, J.R. Chen and T.D. Wood, Nature, July 11, 1996 (vol. 382), Science (institution of Geography, La Jolla, CA 92037-0228, 619-594-6434). "Rejoicing on Chinese Climate: Understanding the Science," publication #39013 0020, 1994, 154 pp., \$11.95, National Safety Council, Box 519, Itasca, IL 61144-0519, 800-621-7619.

GARDEN CARTS pg. 110-111

Wholesale: Ben's Back Beauty Bar, Box 4955 WPA, \$120.21, A.M. Leonard Inc., 241 Fox Dr., Box 816, Fajon, CA 92536, 800-543-0935. **Tip over:** Rubbermaid Standard Trip Track #61324WW, plastic, max. tip 3 in. x 4 in., 1,900 lbs., \$748.44, Case rubbermaid Plastics Co., 4181 Denver

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